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COMMONWEALTH OF MASSACHUSETTS SUMMARY OF WATER QUALITY 1988

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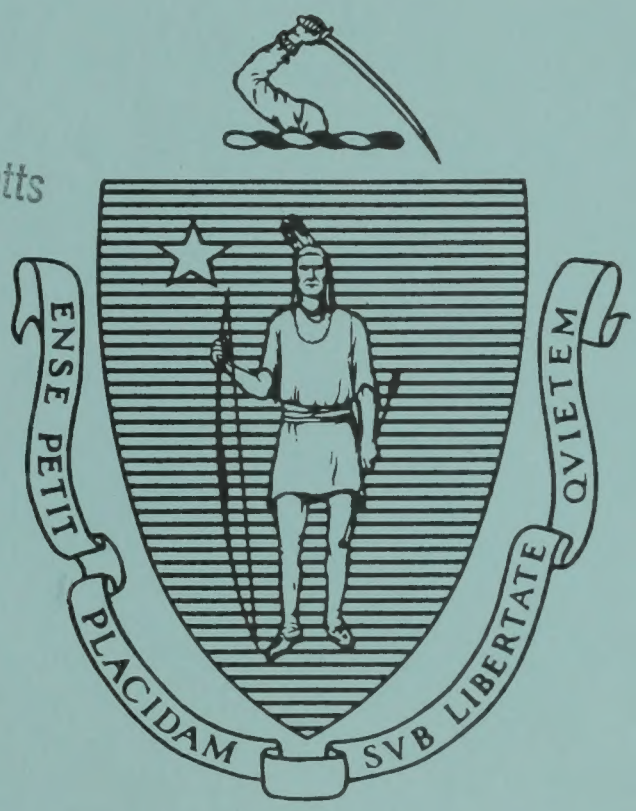

Massachusetts Department of Environmental Quality Engineering
Kenneth Hagg, Acting Commissioner

DIVISION of WATER POLLUTION CONTROL

Thomas C. McMahon, Director

882/366

COMMONWEALTH OF MASSACHUSETTS

SUMMARY OF WATER QULAITY

1988

Massachusetts Department of Environmental Quality Engineering
Division of Water Pollution Control
Technical Services Branch

Executive Office of Environmental Affairs
James S. Hoyte, Secretary

Massachusetts Department of Quality Engineering
Kenneth Hagg, Acting Commissioner

Division of Water Pollution Control
Thomas C. McMahon, Director

Westborough, Massachusetts
March 1988

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EXECUTIVE SUMMARY

The Massachusetts Department of Environmental Quality Engineering (DEQE) has many divisions involved in the sampling, studies, preservation, clean-up and restoration of the surface and groundwaters of the Commonwealth. Each division operates under its regulations and management programs to protect and improve water quality.

Surface Water Quality

The surface water quality in Massachusetts has improved considerably since the Federal Water Pollution Control Amendments were enacted in 1972. The data presented in this report indicate that 43% of the 1646.1 river miles assessed and 32% of the 170.66 estuary square miles assessed fully support their designated classification. Only 20% of the river miles and 3.5% of the estuary square miles do not support their classification.

Ninety-one and a half percent of the lakes and ponds acreage assessed meet oligotrophic or mesotrophic status. Causes of partial and non-support in river miles were found to be pollutant loadings from point sources (18.5%), nonpoint sources (20.3%) and both point and nonpoint sources (21.1%). Similarly, estuary square miles are affected by point sources (5.9%) nonpoint sources (39%) and both point and nonpoint sources (26.8%). It appears the water quality impacts from point sources are declining as a result of the construction and upgrading of wastewater treatment plants. Nonpoint sources, however, continue to degrade the water quality and are more apparent now that the point sources have improved.

In rivers and estuaries coliform bacteria is the leading cause of the partial and non-support status. Combined sewer overflows and municipal WWTP's are the major point source, while urban runoff and failing septic systems are the leading nonpoint sources of bacteria contamination. Nutrients are the second most common pollutant from point sources, while dissolved oxygen and biochemical oxygen demand concentrations are the second cause from nonpoint sources.

In lakes and ponds, the leading cause of a eutrophic status is elevated nutrient concentrations from surface runoff and failing septic systems. These nutrients lead to dense macrophyte growth and algal blooms, which further cause hypolimnetic dissolved oxygen problems.

Toxic chemicals have been monitored in 60.7% of the rivers and 22.7% of the estuaries with 26.4% of the monitored rivers and 61.5% of the monitored estuaries affected. Bioassessments, fish tissue monitoring and toxicity testing have recently been added to the water quality monitoring surveys.

The monitoring data indicate that 92.2% of the river miles are fishable and 7.8% are posted with a fish consumption advisory. Likewise, 67.8% of the estuaries are fishable, 31.0% of the estuaries have a fish consumption advisory and 1.2% of the square miles have a fishing ban. PCB and heavy metal contamination are the cause of the fish consumption advisories and bans. High levels of pollution in Boston Harbor have resulted in the elevated percentages of liver lesions, tumors and fin rot.

Shellfish contamination has been increasing rapidly, and is being caused primarily caused by domestic sewage which results in unacceptably high concentrations coliform bacteria. Many of the north shore shellfish flats have been closed since the early 1930's and more have recently become affected.

Groundwater Quality

Groundwater contamination is becoming apparent due to the increasing number of groundwater public water supplies being closed. Forty-one communities have lost a part or all of their municipal water supplies to contamination. Twenty municipalities were closed because of organics, five municipalities were closed due to petroleum products, five municipalities were closed from iron and manganese. Pesticide contamination and agricultural activities are the leading cause of private well closures.

The leading sources of water supply contamination are industrial activities, leaking underground tanks, landfills, road salt and overdevelopment.

Abatement Programs

Several Divisions within DEQE and their related programs are involved in the clean-up of the surface and groundwaters of the Commonwealth. A key component of the Division of Water Pollution Control (DWPC) is point source pollution abatement. There are four programs funded by federal and state grants and loans available for construction. These include 1) 70% state only grants to municipalities for projects not likely to receive federal assistance, or for correction of combined sewer overflows, 2) grant funds to improve Boston Harbor, 3) state funds for other rehabilitation of leaking sewage collection and transmission lines and 4) sewer collection systems grant programs.

The Division, in cooperation with the U.S. Environmental Protection Agency, has issued over 1,000 surface water discharge permits which are periodically reviewed by DWPC personnel. In addition, technical assistance and training for proper operation and maintenance at treatment facilities is provided, as well as training and certification for operators.

Groundwater contamination is being addressed by programs in the Division of Water Pollution Control (DWPC) Division of Water Supply (DWS), Division of Solid Waste Management (DSWM) Division of Hazardous Waste (DHW). The DWPC has a groundwater discharge permit program which issues groundwater discharge permit limits and monitoring requirements based on the groundwater designation. The Division is also beginning a new nonpoint source program and control strategy. The DWSM funds programs to be used in the prevention and clean-up of contaminated public water supplies, and for land acquisition for aquifer protection. The new Division of Solid Waste Management is in the process of rewriting more stringent regulations and establishing better disposal methods. Finally, the DHW is expanding its program to identify and clean up more contaminated sites each year. A new underground storage tank regulation was enacted in 1986 requiring notification of all underground tanks and leak testing on a regular basis.

These programs, as long as funding is available, plus local activities and involvement will continue to improve the water quality of the Commonwealth's surface and groundwaters.

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INTRODUCTION

The waters of the Commonwealth of Massachusetts have been subjected to degradation from various sources such as domestic sewage, industrial chemicals, urban runoff, and atmospheric deposition. Water quality problems were amplified as population increased and industrial development intensified. Often untreated or poorly treated wastewater was disposed into the nearest waterbody with little regard for the quality of the receiving water. The problems associated with wastewater disposal and stormwater runoff have been recognized for decades by members of the scientific community and to varying degrees by the general populace. Stern and expensive measures were necessary to retard and eliminate the degradation of the waters of the Commonwealth. The vehicle to re-establish the quality of the water resources was provided by the landmark legislation passed by Congress in 1972 - the amendments to the Federal Water Pollution Control Act, Public Law 92-500. This act set forth goals and a policy for the attainment of desired water quality across the nation. Most important, the act provided funds necessary to finance the vast water pollution abatement projects necessary to achieve and maintain water quality goals.

Section 305(b) of the Clean Water Act requires each state to submit a biennial report to the EPA describing the quality of its navigable waters. This report includes the following: an analysis of the extent to which the state's waters provide for healthy shellfish, fish, and wildlife populations and recreation in and on the water; an analysis of the extent to which pollution control actions have achieved this level of water quality and recommendations for needed additional actions; and a description of the nature and extent of nonpoint sources of pollution and recommendations for their control.

BACKGROUND

The geology of Massachusetts is divided into two provinces: the Coastal Plain and the New England Upland. Cape Cod and the Islands form the coastal plain and consist of low hills and plains covering unconsolidated sediments which form the most productive aquifers in the State. The New England Upland province consists of till and stratified drift above metamorphic and igneous rocks, and provides small productive aquifers.

The Commonwealth of Massachusetts has the largest population of the six New England states by over 2-1/2 million people, with the majority of the population in the eastern portion. There are a significant number of freshwater, coastal and groundwater resources used by the people for water supply and recreation. These sources are monitored and regulated by the Department of Environmental Quality Engineering. Table 1 below presents a summary of surface waters.

TABLE 1

SUMMARY OF STATE WATERS

State Population (1985)	5,746,441
Total Surface Area (mi^2)	8,257
Number of Drainage Basins	32
Number of Interstate Basins	12
Total River Miles	10,704
Number of Lakes and Ponds	2,859
Area of Lake and Ponds	150,341
Area of Marsh and Wetland (acres)	362,165
Area of Harbors (mi^2)	171
Total Coastal Miles	1,519

Figure 1 DRAINAGE SYSTEMS

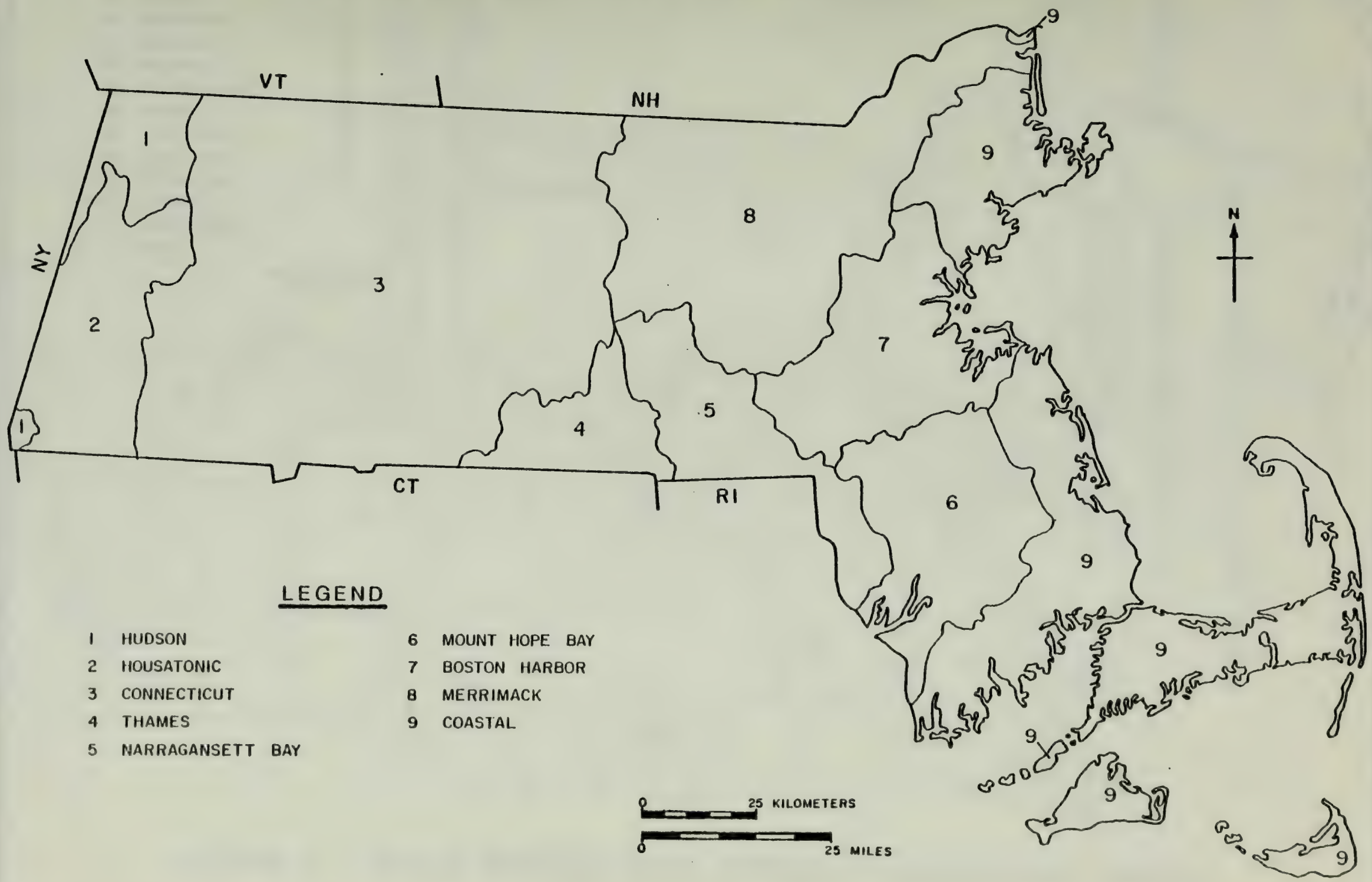
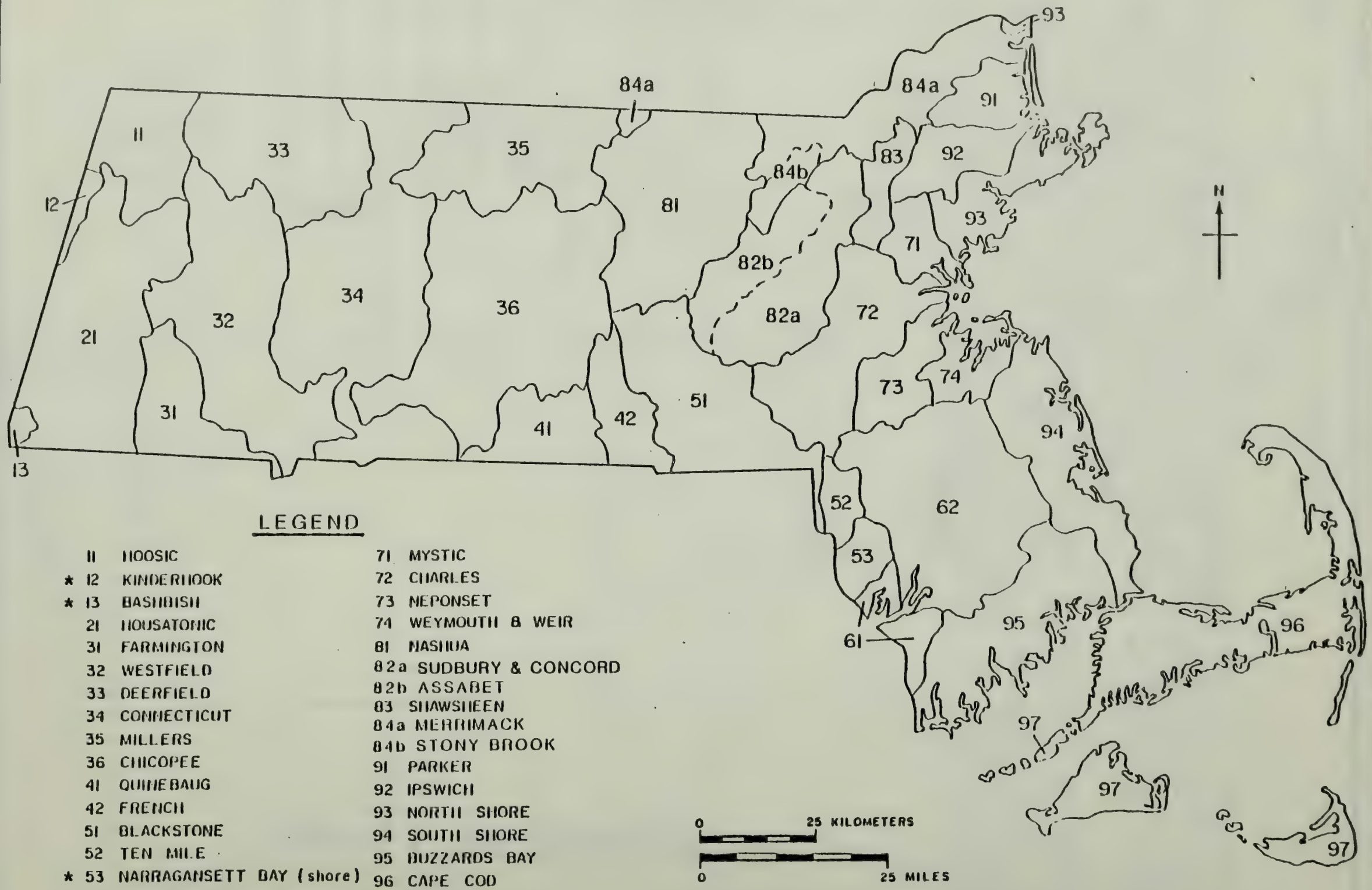


Figure 2 RIVER BASINS and COASTAL DRAINAGE AREAS



LEGEND

	11 HOOSIC	71 MYSTIC
*	12 KINDERHOOK	72 CHARLES
*	13 BASHBISH	73 NEPONSET
	21 HOUSATONIC	74 WEYMOUTH & WEIR
	31 FARMINGTON	81 NASHUA
	32 WESTFIELD	82a SUDBURY & CONCORD
	33 DEERFIELD	82b ASSABET
	34 CONNECTICUT	83 SHAWSHEEN
	35 MILLERS	84a MERRIMACK
	36 CHICOPEE	84b STONY BROOK
	41 QUINEBAUG	91 PARKER
	42 FRENCH	92 IPSWICH
	51 BLACKSTONE	93 NORTH SHORE
	52 TEN MILE	94 SOUTH SHORE
*	53 NARRAGANSETT BAY (shore)	95 BUZZARDS BAY
	61 MOUNT HOPE BAY (shore)	96 CAPE COD
	62 TAUNTON	97 ISLANDS

* No information presented in this report.

TABLE 2

SUMMARY OF CLASSIFIED USES OF ASSESSED WATERS

CLASSIFIED USE	TOTAL SIZE CLASSIFIED FOR USE		
CLASS	FISHERIES DESIGNATION*	RIVER MILES	SQUARE MILES
A	-	44.3	-
B	AL	58.9	-
B	CWF	250.5	-
B	SCWF	295.8	-
B	WWF	831.5	-
C	WWF	14.0	-
SA	-	64.4	101.97
SB		86.7	66.02
SC	-		2.3
AD**	-	591.7	65.07

* See Appendix I for descriptions

AL = Aquatic Life, CWF = Cold Water Fishery, SCWF = Seasonal Cold Water Fishery, WWF = Warm Water Fishery

** Anti-degradation

SURFACE WATER QUALITY

Areas (miles, square miles and acres) where water quality data, fish/shellfish sampling data and biological assessment data are available have been assessed. Assessments for support, partial support and non-support were made for the river miles and harbor square miles in the Commonwealth based on the waters classification and designated uses. Lakes and ponds were not assessed according to support status, but rather according to trophic status.

The summary of support status for the monitored river mileage and harbor areas is presented below. The classification of support status by basins is presented in Table 3, and further divided into basin segments that include the cause of nonsupport in Appendix III. A more detailed breakdown of the trophic status of lakes and ponds can be found in Appendix II.

RIVERS

Number of miles supporting classification	713.0
Number of miles partially supporting classification	597.8
Number of miles not-supporting classification	335.3
Total miles assessed	1646.1

BAYS AND HARBORS

Square miles supporting classification	54.27
Square miles partially supporting classification	110.45
Square miles not-supporting classification	5.94
Total square miles assessed	170.66

For fishable/swimmable status see page 16 and Table 6.

LAKES & PONDS

Trophic status of Surveyed Lakes	Severity Points	Acres	# of Lakes
Eutrophic	13-18	4,220	56
Mesotrophic	7-12	29,269	289
Oligotrophic	0-6	16,136	133
	Totals:	49,625	478

Unknown Acres = 150,341 - 49,625 = 100,716
Lakes/Ponds not surveyed = 2859 - 478 = 2381

STATUS OF CH. 628 CLEAN LAKES PROGRAM* (# LAKES)

FY	83	84	85	86	87	88 (Potential)
Phase I	23	23	13	15	15	17
Phase II	6	6	6	18	9	20
Maintenance Projects	2	7	4	3	0	3

*Many of these projects are in various stages of completion

A Phase I project is a diagnostic/feasibility study of a lake or pond which identifies existing and potential pollution problems and recommends cost-effective and feasible solutions.

A Phase II project is the implementation of the Phase I recommendations for long-term restoration and preservation of the lake/pond and its watershed.

Water quality maintenance projects are short-term remedies for nuisance aquatic vegetation and algal problems.

The DWPC Lakes Section classifies lakes/ponds by trophic status but not by use. Therefore, designated uses does not apply to the Commonwealth's Lakes and Ponds Classification System.

An outline of the Lakes Classification Program and the methodology employed in determining trophic state is found in Appendix II (p. A-II-1).

WATER QUALITY CHANGES & TRENDS

Since 1986, water quality in the state has not changed considerably although the mileages assessed and support status reported are slightly different from those reported in 1986.

The number of river miles assessed are lower due to several factors. First, some tributaries have not been monitored within the past ten years and thus current support status cannot be determined. In addition, several coastal rivers were changed from river miles to estuary square miles, increasing the harbors and bays total area and reducing the river miles assessed.

During the summers of 1986 and 1987, several rivers were re-surveyed, thereby updating the water quality database. This led to several rivers being either upgraded or downgraded in support status. The Assabet River for example, was surveyed after a new regional advanced wastewater treatment plant went on-line. Three other treatment plants on the river had also been upgraded in the past year. These WWTP upgradings have improved the water quality, reducing the length of the river not supporting designated use from 96.8% to 36.8%.

In contrast to the Assabet, the Merrimack and Neponset rivers also had extensive water quality surveys conducted in 1986. Water quality data from these surveys indicated severe problems and water quality violations. Coliform bacteria concentrations were elevated due to combined sewer overflows, illegal discharges and leaking sewer systems. Bacterial concentrations were high enough to downgrade the river from partial support to non-support status.

The Division tries to survey each river basin every five years to update water quality data, monitor upgraded treatment plants and determine new sources of pollution. Some basins, however, have not been monitored in over ten years and the assessments are based on the historic data and professional judgement.

Due to the construction and upgrading of the WWTP's, the rivers are improving. New problems are now being discovered due to nonpoint sources and toxic contamination. These problems have always been around but were previously masked by the loading of poorly treated wastewater. In addition, new sampling and testing procedures are becoming available to monitor for toxics.

BASIN/SEGMENT INFORMATION

A summary of water quality by drainage basin is presented in Table 3. Appendix III contains detailed summaries of 32 drainage basins. Each synopsis contains a narrative basin description, a water quality conditions and trends description, a bibliography of up-to-date basin reports, a basin map, and a classification table of water quality segments. These summaries appear in alphabetical order with the basin order shown in Figure 2. Each classification table has seven elements that are defined below.

1. Segment Description: A description of the river segment or harbor.

2. River Miles/Area: Inclusive mile points of the segment, where 0.0 is the mouth of the river, or the area of a harbor in square miles.

3. Water Use Classification: Freshwater rivers are classified A,B, and C; coastal or marine waters are classified SA, SB,SC. Waters are further divided into cold water fishery (CWF), seasonal cold water fishery (SCWF), warm water fishery (WWF) and aquatic life (AL). Some waters are protected from accepting new or increased discharges by the antidegradation (AD) Provision of 314 CMR 4.04(3). See Appendix I for further criteria and definitions.

4. Support Status: An indication that the segment supports (S), partially supports (PS), or does not support (NS), its water classification. If data are not available, the support status is designated as unknown (U).

5. Water Quality Problems: Those parameters, including natural conditions, which cause a segment not to meet its designated classification.

6. Source(s) of Problems: Natural or anthropogenic inputs which cause noncompliance.

7. Abatement Needs to Meet Classification.

TABLE 3

BASIN WATER QUALITY SUMMARY

	Miles Assessed	Miles Meeting Standards	Miles Partially Meeting Standards	Percentage Meeting Standards	Percentage Partially Meeting Standards
Assabet River Basin (82)	31.0	0	19.6	0	63.2
Blackstone River Basin (51)	84.9	36.0	17.2	42.4	20.3
#Boston Harbor Basin (70)	47.3	8.1	39.2	17.1	82.9
*Buzzards Bay Basin (95)	63.4/ 29.75	14.4/ 17.79	48.0/ 8.02	22.7/ 59.8	75.7/ 45.1
#Cape Cod Basin (96)	25.59	0	25.59	0	100
Charles River Basin (72)	91.9	44.4	27.3	48.3	29.7
Chicopee River Basin (36)	134.5	62.8	68.7	46.7	51.1
Connecticut River Basin (34)	79.9	54.2	9.8	67.8	12.3
Deerfield River Basin (33)	79.2	76.8	0.5	97.0	0.6
Farmington River Basin (31)	25.6	25.6	0	100	0
French River Basin (42)	35.5	21.2	9.5	59.7	26.8
Hoosic River Basin (11)	37.9	8.5	27.6	22.4	72.8
Housatonic River Basin (21)	79.5	20.2	47.1	25.4	59.2
Ipswich River Basin (92)	36.6	32.1	4.5	87.7	12.3.
#Islands Basin (97)	23.37	6.17	17.2	26.4	73.6
Merrimack River Basin (84)	72.8	0	13	0	17.9
Millers River Basin (35)	51.0	28.5	22.5	55.9	44.1
Mount Hope Bay Drainage Basin (61)	7.2	0	1.8	0	25.0
Mystic River Basin (71)	16.4	0	0	0	0
Nashua River Basin (81)	101.3	34.1	47.2	33.7	46.6
Neponset River Basin (73)	32.6	0.0	0.0	0	0
*North Shore Coastal Drainage Area	43.0/ 17.44	0/ 9.35	20.4/ 16.09	0/ 34.1	47.4/ 58.6
Parker River Basin (91)	22.0	22.0	0	100.0	0
Quinebaug River Basin (41)	38.1	31.0	2.0	81.4	5.3
Shawsheen River Basin (83)	25.0	0	23.3	0	93.2
*South Shore Drainage Basin (94)	51.7/ 17.21	18.4/ 12.86	20.1/ 4.35	35.6 74.7	38.9/ 25.3
Stony Brook Basin (84)	17.5	0	12.3	0	70.3
South Shore Coastal Drainage Area	63.9	9.3	37.0	14.6	57.9
Taunton River Basin (62)	172.7	70.7	102.0	40.9	59.0
Ten Mile River Basin (52)	31.6	10.9	11.9	34.5	37.7
Weymouth and Weir River Basin (74)	13.4	2.9	0	21.6	0
Westfield River Basin (32)	106.0	89.0	4.5	84.0	4.2
TOTALS	1646.1/ 170.66	713.0/ 54.27	597.8/ 110.45	43.3/ 31.8	36.3/ 64.7

* River miles/embayment area
\# Embayment area only (mi^2)

ASSESSMENT STATUS OF TOXICS AND NON-TOXICS

Of the 10,704 river miles in the state, 1646.3 miles are reported on in this document (Appendix III), of which 1618.6 miles have been monitored for conventional and non-conventional pollutants, and 999.2 miles have been monitored for toxics. (Toxics are defined as the 126 priority pollutants listed under Section 307(a) of the CWA). Of the miles that have been monitored, 58% are affected by conventional pollutants (BOD_5, TSS, pH, fecal coliform and oil & grease) and 28% are affected by non-conventional pollutants (nutrients).

Only 60% of the river miles assessed have been monitored for toxics. Of the miles monitored, 26.4% are affected. Toxics monitoring by the Division generally consists of only heavy metals and not the acid/base extractables or volatiles listed under Section 307(a).

Also, 170.66 square miles of harbors and estuaries are reported on, of which the assessment of 170.12 square miles were monitored for conventional pollutants, 169.65 square miles were monitored for non-conventional pollutants and 38.8 square miles were monitored for toxics. The coastal toxics monitoring is based only on sediment sampling because the state laboratory does not have the proper equipment to adequately detect low concentrations of metals in sea water. Of the square miles monitored, 61.5% are affected by conventional pollutants, 10% are affected by non-conventional pollutants and 42% of the sediments had high toxics concentrations. Since only 22.7% of the sediments were monitored, the status of the remaining 77% of the estuary areas are unknown.

SUMMARY OF ASSESSMENT STATUS

	(SQ.)MILES MONITORED FOR:			(SQ.) MILES AFFECTED BY:		
	TOXICS	Conventional POLLUTANTS	Non-Conventional POLLUTANTS	TOXICS	Conventional POLLUTANTS	Non-Conventional POLLUTANTS
Rivers	999.2	1618.6	1618.6	263.6	937.3	454.2
Estuaries	38.8(s)	170.12	169.65	16.39(s)	104.66	16.9

(s) Toxic analyses in estuaries is in the sediments only.

SOURCES OF POLLUTION

RIVERS AND ESTUARIES

The water quality in the Commonwealth's rivers and estuaries are affected by both point and nonpoint sources of pollution. Of the 1646.1 river miles surveyed, water quality in 303.8 miles (18.5%) have been affected by only point sources, 334.9 miles (20.3%) by only nonpoint sources and 347.9 miles (21.1%) by both point and nonpoint sources of pollution. This results in 651.7 miles (39.6%) of other waters affected by point sources and 682.8 miles (41.5%) affected by nonpoint sources, totaling 59.9% of other waters. Table 4 breaks the mileages down further into point and nonpoint sources causing major impacts (nonsupport) or moderate/minor impacts (partial support).

Similarly, estuaries are evaluated in square miles affected by point and nonpoint sources. Point sources alone affect ten square miles (5.9%), nonpoint sources alone affect 66.48 square miles (39%) and both point and nonpoint sources affect 45.78 square miles (26.8%) of the estuaries.

Point source pollution results from industrial discharges, municipal WWTP discharges and combined sewer overflows (CSO's), all which are regulated through the NPDES permit process by the state and federal government. Nonpoint sources come from a wider range of sources including: urban runoff, failing septic systems, illegal discharges, agricultural practices, vessels and marinas, in-place sediments, natural conditions, hazardous waste sites, landfills (leachate) and birds and waterfowl (See Table 5).

Of the point sources, municipal discharges had the greatest effect on water quality while industrial discharges caused a larger number of pollutant impacts. Combined sewer overflows caused bacteria problems in more basins than municipal WWTP's. Municipal WWTP's, however, were more responsible for elevated nutrient and BOD problems than combined sewer overflows.

Of the ten nonpoint sources listed, urban runoff was cited as a source of pollution in more basins than any other source of pollution. The leading cause of water quality problems from urban runoff is coliform bacteria, followed by dissolved oxygen/BOD, nutrients, oil and grease, solids and metals. Sediments were the leading source of metal, PCB and organic contamination. Sediments, however, are not normally sampled in freshwater rivers unless there is a suspected problem. In coastal waters, metals are not sampled in the water column, only in the sediments.

The coastal basins reported coliform problems from vessels and marinas, and birds and waterfowl. These sources did not affect inland waters.

Natural conditions (wetlands) were a major cause for dissolved oxygen violations and color problems in several sluggish rivers.

LAKES AND PONDS

The water quality in the Commonwealth's lakes and ponds is summarized in Appendix II. Of the 2859lakes and ponds in the state, 523 have been surveyed by the Division. One hundred and thirty-six of these lakes and ponds are considered impaired or threatened (referring to other recreational values of

TABLE 4

PARTITIONING OF POINT AND NONPOINT SOURCE IMPACTS

Impact	ONLY POINT SOURCES		ONLY NON-POINT SOURCES		BOTH POINT AND NON-SOURCES	
	Major Impact Non-Support	Moderate/Minor Impact Partial Support	Major Impact Non-Support	Moderate/Minor Impact Partial Support	Major Impact Non-Support	Moderate /Minor Impact Partial Support
Number of Rivers	15	11	10	16	13	13
Miles Affected	162.1	141.7	55.5	279.4	142.5	205.4
% Affected	9.8%	8.6%	3.4%	17.0%	8.7%	12.5%
Number of Estuaries	0	1	1	5	2	4
Square Miles	0	10	0.18	66.3	8.86	36.92
% Affected	0	5.9%	0.1%	38.8%	5.2%	21.6%

TABLE 5

NUMBER OF BASINS REPORTING POLLUTANT AND SOURCE

Category Nonpoint Source	Oil & Grease	Bacteria/ Pathogens	Nutrients	Turbidity/ Solids	D.O. BOD	Metals	PCB's	Organics	Color	Total
Agriculture	-	6	2	1	1	-	-	-	-	10
Birds/Waterfowl	-	3	-	-	-		-	-	-	3
Failing Septic Systems	-	16	4	-	-	-	-	-	-	20
Hazardous Waste Sites	-	-	-	-	-	2	1	-	-	3
Illegal Discharges	-	9	2	-	1	-	-	-	-	12
In-place Sediments	1	-	3	-	4	7	5	1	-	21
Landfills/Leachate	-	-	2	1	-	2	-	-	-	5
Natural Conditions	-	5	1	-	10	-	-	-	2	18
Urban Runoff	2	24	5	2	12	2	-	-	-	47
Vessels/Marinas	1	5	1	-	1	-	-	-	-	8
TOTAL	4	68	20	4	29	13	6	1	2	
Point Source										
Industrial	1	4	8	2	3	4	2	3	1	28
Municipal	-	14	16	5	12	4	-	-	-	51
CSO's	1	18	8	1	10	3	2	-	-	43
TOTAL	2	36	32	8	25	11	4	3	1	

swimming, fishing and boating). Dense algal blooms, low transparency and anoxic conditions threaten and impair the recreational uses. These are often the result of high nutrient loads and siltation from nonpoint sources of pollution. Surface runoff and failing septic systems are the leading causes of organics enrichment followed by agricultural runoff, internal loading and siltation/erosion. Tributaries, acid rain, wetland drainage and land disposal also contributed problems to some lakes and ponds.

There are not a significant number of point sources of pollution to the lakes and ponds. Combined sewer overflows were the most common point sources followed by wastewater treatment plant discharges and industrial discharges.

FISHABLE/SWIMMABLE STATUS

Fishable/swimmable is defined as "providing a level of water quality consistent with the goal of protection and propagation of a balanced population of shellfish, fish and wildlife, and allowing for recreational activities in and on the water." It is difficult to provide an analysis of the degree to which the fishable/swimmable goal is met in every stream. For example, a stream may be fishable, but not swimmable, complicating the evaluation. This year the fishable/swimmable status will be divided into fishable status and swimmable status for analysis.

SWIMMABLE STATUS

The operation and closure of bathing beaches, as of the passage of Title 8 of the state sanitary code, is the responsibility of the local town officials and Boards of Health. The state is responsible only for the monitoring and closing of the state owned and operated beaches.

Local town officials or Boards of Health generally establish their own monitoring programs and set their own limits for beach closures. Some communities are more careful and detailed in their monitoring and enforcement than others. Towns and cities are required to follow the 1969 State Sanitary Code, Article 7 for minimum standards for bathing beaches. This code stated a "total count over 1000/100 ml" (coliform bacteria) shall be considered a guide for further investigations, and the waters should have a minimum four foot secchi disk visibility. In 1983 a Draft State Environmental Code (Title 3), titled "Minimum standards for bathing beaches" was proposed. This code would have established a maximum allowable fecal coliform bacteria concentration of 200 org/100 ml and kept the minimum visibility depth of four feet. The draft, however, was never adopted.

The state is responsible for all state owned and managed recreation areas and parks. Recreation areas within the Route 128 highway are managed and run by the State Metropolitan District Commission (MDC). State recreation areas and parks outside of Route 128 are managed and run by the state Department of Environmental Management (DEM). The DEM is sub-divided into five regions across the state.

The MDC has conducted weekly monitoring of their beaches during the summer for 13 years. Originally the MDC sampled for total and fecal coliform bacteria, posting warnings against swimming when the fecal coliform level exceeded 500 org/100 ml. The warnings are presently posted when the fecal coliform concentrations exceed 200 org/100 ml. The MDC is currently looking into the monitoring of (E. coli) and posting warnings based on E. coli limits.

In 1987, the MDC monitored 32 salt water stations at 16 beaches, and four (4) freshwater ponds. Thirty-three separate warnings were posted at six (6) beaches on 15 different days. Some beaches had postings at two or more sites. Closures occured after heavy rainfalls when nearby CSO's discharged raw sewage to the harbor.

The DEM tests state bathing beaches every other week for total and fecal coliform. If total coliform concentrations above 1000 org/100 ml are detected, a second sample is immediately taken. If two samples have elevated coliform bacteria, then steps to close the beach or correct the problem are taken.

In 1987, the DEM monitored a total of 68 swimming areas in the state (49 beaches and 19 pools). Of these 68 swimming areas, only one was closed in 1987 for a short period of time. The closure was due to raw sewage from a nearby CSO.

To assess the swimmable status of the rivers and estuaries in the Commonwealth, the fecal coliform maximum concentration limit of 200 org/100 ml was used. Waters with fecal coliform bacteria less than 200 org/100 ml were considered swimmable. Waters that were generally below 200 org/100 ml but occasionally went above the 200 org/100 ml limit were considered partially swimmable and waters where fecal coliform concentrations were always above 200 org/100 ml were considered not swimmable. Of the river miles assessed, 760.4 (96.2%) are considered swimmable, 490.4 (29.8%) are considered partially swimmable and 395.3 (24.0%) are considered not swimmable. In the estuaries and embayment areas 79.06 mi^2 (46.3%) are considered swimmable, 49.04 mi^2 (49.5%) of the waters are considered partially swimmable and 7.04 mi^2 (4.1%) are considered not swimmable.

FISHABLE STATUS

Presently the Division of Fisheries and Wildlife annually stocks 150 trout ponds and 400 streams totalling 2000 miles across the state. Managed waters must be accessible to the general public for fishing, and be of acceptable water quality (Class B or higher). Natural production of fishes in the state supplements the majority of the fishing and is comprised primarily of warm water fishes.

The Class B and C waters of the Commonwealth are designated into specific types of fisheries: cold water fisheries, seasonal cold water fisheries, warm water fisheries and aquatic life. According to the Water Quality Standards, (Appendix 1) the temperature shall not exceed 83°F (28.3°C) in warm water fisheries or 68°F (20°C) in cold water fisheries. In seasonal cold water fisheries the criteria for cold water fisheries apply during the period of September 15 through June 30. Where the Division determines that natural or irreversible conditions prevent the attainment of water quality capable of supporting a warm water fishery, a use designation of aquatic life is made. Of the river miles evaluated, 57.9 miles (3.5%) were designated aquatic life, 273.7 miles (16.6%) were designated cold water fisheries, 27.51 (16.7%) were designated seasonal cold water fisheries and 837.3 miles (50.9%) were designated warm water fisheries (Table 2, page 5). The remaining miles were either Class A, SA or SB waters. Coastal and Marine waters are designated "Marine Fishery" with restrictions placed on shellfish.

Some waters have been monitored for toxic substances in edible fish tissue. Between 1983 and 1986, 17 river sites and 13 lake sites were monitored for toxicants in fish tissue. (See Biomonitoring page 53). The fish data are submitted to the Office of Research and Standards (ORS), Division of Fish and Wildlife, Division of Marine Fisheries and Department of Public Health for review. Consequently fish consumption advisories have been placed on seven (7) waterbodies and a fishery ban has been placed on one waterbody (Table 14 page 55). In addition, the Division of Marine Fisheries has conducted several fish, lobster and shellfish studies on the coastal waters. The data were presented in a report titled "Assessment at Mid-Decade" in November 1985.

Due to incomplete monitoring of the Commonwealth's waters, several assumptions were made while determining the fishable status. Waters with a fishery ban were considered "not fishable," waters with a fish consumption advisory or waters where lesions and tumors had been found were considered "partially fishable" and all other waters were considered "fishable." Thus, several water bodies designated as "fishable" have not been monitored. Table 6 summarizes the fishable status for rivers (in miles) and estuaries (in square miles).

In coastal waters the classification specifies the shellfishing potential of the area. Class SA waters are open for shellfishing, SB waters are restricted for shellfishing (closed or open with depuration) and Class SC waters are closed for shellfishing. The acres of shellfish beds closed or restricted in the Commonwealth are listed in Table 7. No data are available for the total acreage that is open for shellfishing.

TABLE 6

SUMMARY OF FISHABLE/SWIMMABLE STATUS

	RIVER MILES	ESTUARY AREA SQUARE MILES
Fishable	1498.0	115.7
Fishable with Advisory or Abnormalities Found	148.1	52.89
Not Fishable Due to Ban	0	2.07
Swimmable	755.4	79.06
Partially Swimmable	462.8	84.56
Not Swimmable	419.1	7.04

FIGURE 3

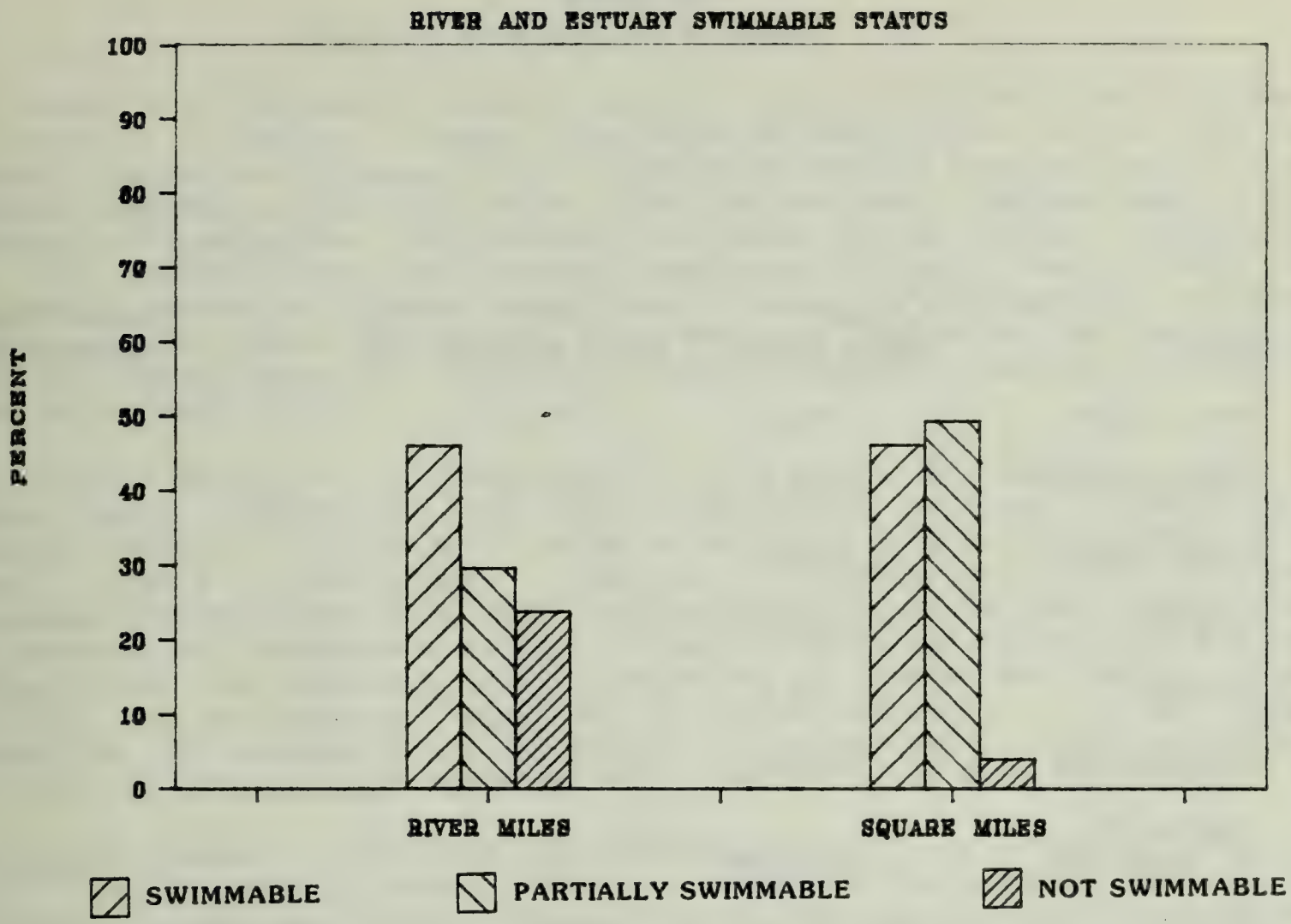


FIGURE 4

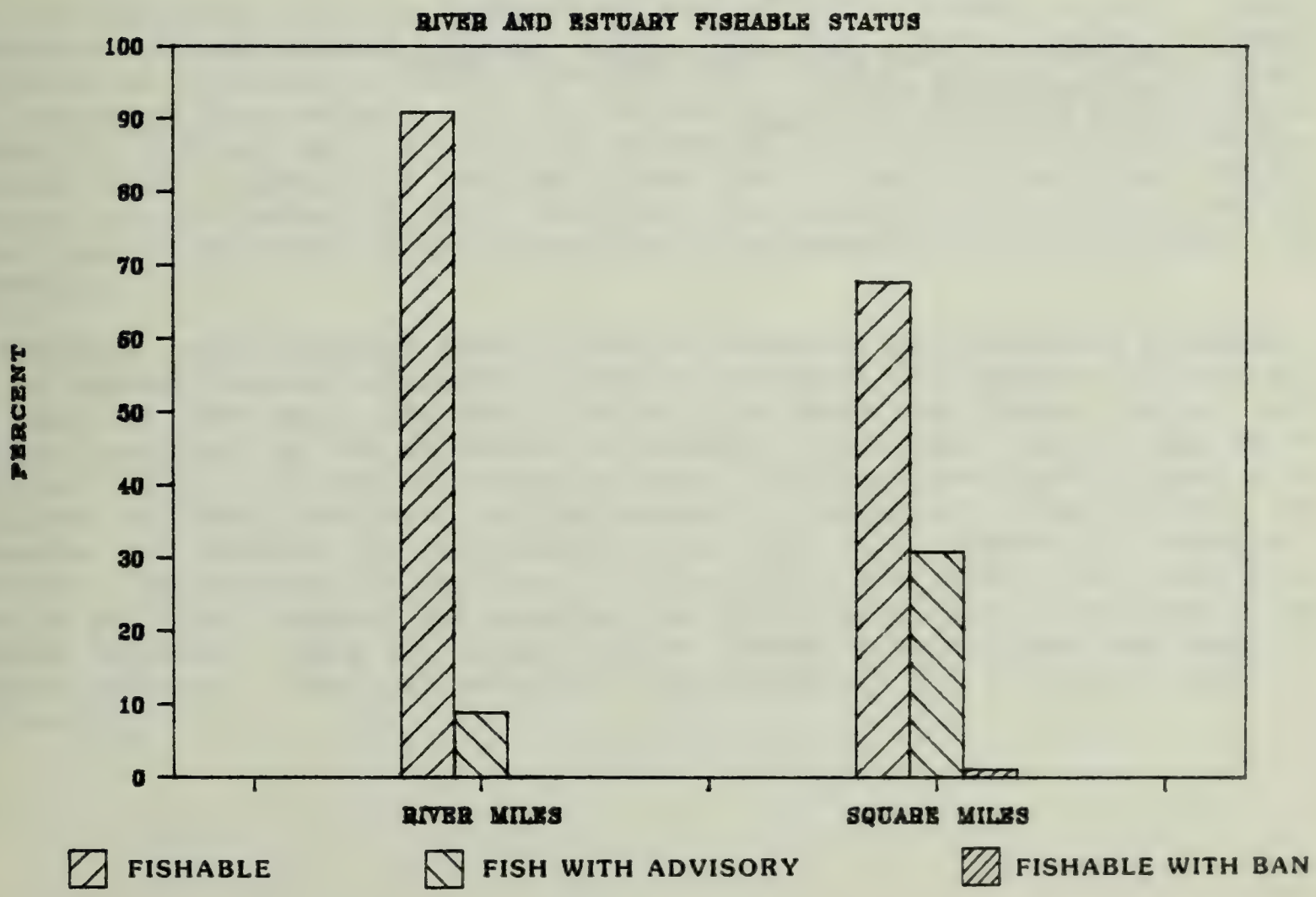


TABLE 7

SUMMARY OF SHELLFISH CLOSURES

Basin	1987 Acres Closed	1987 Acres Restricted*	Acres Closed Since 1984
North Shore	810.1	5143.0	0
Boston Harbor	1826.4	2864.0	0
South Shore	5570.0	-	143.8
Cape Cod	5348.0	-	3245.5
Islands	792.0	-	175.1
Buzzards Bay	17245.8	-	0
Taunton R. Mt. Hope Bay	8055.0**		
TOTALS	39647.3	8007.0	3564.4

* Restricted areas where depuration is required
\- No restricted areas
** 100% of productive area

WETLANDS

The state's DEQE Division of Wetlands and Waterways administers three programs; the Wetlands Protection Program, the Wetlands Restriction Program and the Waterways Regulation Program. In the Wetlands Protection Program, the Division develops regulations and policies to guide the regulatory process used by the conservation commissions, and enforce provisions of the Wetlands Protection Act. In administering the Waterways Regulation Program, the Division is required to review and license activities in the state's waterways; including tidelands, great ponds and rivers. The Wetlands Restriction Act provides a permanent means for the state to protect sensitive wetland areas with conservation restrictions.

The Wetlands Protection Act (WPA) (GL Ch. 131 S. 40) was enacted in 1963 to protect public interests in both inland and coastal wetlands by prohibiting removing, dredging, filling or altering of wetlands without the issuance of a permit (Order of Conditions). The act is administered first by local conservation commissions, with the Division getting involved with appeals from the conservation commissions rulings. The provisions of the act are for the protection of the following eight interests; 1) public and private water supplies, 2) groundwater supplies, 3) flood control, 4) storm damage protection, 5) prevention of pollution, 6) protection of land containing shellfish, 7) protection of fisheries and 8) protection of wildlife habitat.

The eighth interest, protection of wildlife habitat, was recently added in 1987. Other recent changes include regulations eliminating the use of herbicides in wetlands located within rights of way; special provisions for the protection of rare and endangered wildlife species; and an expanded education and training program.

The Massachusetts Wetlands Protection Act defines wetlands as any "bank, freshwater wetland, coastal wetland, beach, dune, flat, marsh, meadow, or swamp bordering on the coast or on any estuary, creek, river, stream, pond or lake, any land under these waters, any land subject to tidal action and coastal storm flowage or flooding and a buffer zone extending 100 feet horizontally from the resource area" (except the 100 year flood plan). Wetlands have many values ranging from protection of fish, wildlife, and aquatic habitats to improving water quality of rivers, lakes, estuaries and groundwater to flood control and protection.

In addition, other programs have allowed wetlands to be bought and protected. In the current Coastal Acquisition Program, most available parcels of property on Cape Cod have been acquired. Belle Isle Marsh (in Boston Harbor) was recently acquired by the Metropolitan District Commission. During the years 1984 and 1985, 43 parcels of coastal property totalling over 1,900 acreas were acquired by the Department of Environmental Management. The Division of Fisheries and Wildlife is continuing to purchase salt marshes for waterfowl habitat. Furthermore, active local groups within the cities and towns also provide political support and enhance the public awareness of the values of wetland systems. There are several other federal statutes that are used to protect wetlands. These statutes are implemented by the U.S. Army Corps of Engineers.

In Massachusetts, the Wetlands Act generally prohibits destruction of salt marshes and only alterations of up to 5,00 square feet of freshwater wetlands (with replacement). These regulations plus the aquisition and protection programs have resulted in minimizing the loss of wetland acreage.

A limited number of inventories and studies of wetlands in the state have been conducted. The U.S. Fish and Wildlife Services' National Wetlands Trends Study (NWIS) by Frayer et al. in 1983 compiled a list of coastal wetlands in each state. This accounted for nine of the 14 counties. In addition, the Lloyd Center for Environmental Studies and the Massachusetts Coastal Zone Management Program compiled an inventory of coastal wetlands entitled Barrier Beaches, Salt Marshes and Tidal Flats: An Inventory of the Coastal Resources of the Commonwealth of Massachusetts, which also inventoried wetland acreages at nine of the 14 counties. These acreages are listed in Table 8. No recent data are available on wetland loss rates; however, in a 1983 report from the University of Massachusetts Water Resources Research Center, an annual statewide wetland loss rate of 0.4% is reported from a 1978 U.S. Soil Conservation Service Report. All of the states wetlands have been mapped by the National Wetland Inventory of the U.S. Fish and Wildlife Service.

TABLE 8

TYPE, LOCATION AND AREA OF COASTAL WETLANDS

	Salt Marsh	Fresh Marsh	Tidal Flats	Swamp
United States	4.4 million	1.5 million	211,000	5 million
Massachusetts	48,105	15,117	41,515	24,867
Barnstable County	15,201	2,884	17,809	2,457
Bristol County	3,748	2,077	3,130	2,582
Dukes County	1,028	70	1,259	315
Essex County	18,027	1,963	6,088	4,567
Middlesex County	0	3,574	0	6,540
Nantucket County	657	308	137	122
Norfolk County	1,057	656	2,335	2,565
Plymouth County	7,400	3,534	9,370	5,626
Suffolk County	987	51	1,387	93

The Frayer study concludes that the Nation (that is, the 48 contiguous states) has 11.32 million acres of wetlands on its coasts. Massachusetts, with 0.13 million, has 1.1% of the national total.

Source: Frayer et al.

The U.S. Fish and Wildlife Service in 1983 published a report, Status and Trends of Wetlands and Deepwater Habitats in the Coterminous United States 1950'S to 1970'S. This study represents the only major attempt to survey both coastal and inland wetlands. However, because data was compiled by random sampling rather than a comprehensive history, the report is only meaningful at a national or regional level; and not reliable at the state or local level.

GROUNDWATER QUALITY AND PROGRAMS

DIVISION OF WATER SUPPLY

Overview

The evaluation of groundwater quality is based on water quality data from public water supply wells. Two hundred and seventy-five of the 351 cities and towns in Massachusetts rely partially or solely on groundwater sources for their drinking water supply. Groundwater supplies serve approximately 33% of the Massachusetts population, with around 400,000 individuals relying on private on-site wells. The remaining 67% of the population relies on surface water reservoirs. The six largest public water supply systems (M.D.C., Springfield, Worcester, New Bedford, Brockton and Fall River) serve approximately 47% of the state's population. Three hundred and sixty-three separate central water supply systems exist in 293 towns, and consists of 68 private water companies, 78 fire and water districts and 217 municipal water departments.

Water Supply Closures and Sources of Contaminants

Since 1960, 41 municipalities have been affected by chemical or bacterial contamination (excluding Giardia) of municipal water supplies. This has resulted in temporary or permanent closures of 108 public wells, well fields or reservoirs across the state. There are few statistics on private well closures. Contaminants were discovered through routine testing, the State Purgeable Organic Testing Program, (SPOT), citizen requests, special studies and miscellaneous monitoring. Towns conduct routine testing for specific microbiological, inorganic and organic contaminants according to the Massachusetts Drinking Water Regulations. The SPOT program, was a one-time effort in which the state tested around 1,000 groundwater supply wells for volatile organics. Special monitoring studies have resulted from requests by towns for DEQE to conduct special testing, by town residents testing their own water supplies, by landfill monitoring or by hazardous spills or leaking tanks occurring near a water supply.

These samplings have resulted in closures of 54 wells and well fields within 41 municipalities (see Table 10). Closures have been due to elevated levels of organics (in 20 municipalities), iron and manganese (5 municipalities), salt (5 municipalities); petroleum products (5 municipalities with threats in an additional 4 municipalities), coliform (in 2 municipalities); and EDB, a pesticide, (in 2 municipalities). The following contaminants each caused closures in one municipality: nitrates, MBAs, phenols, trihalomethanes, and calcium carbonate.

Nine (9) of the closures were due to industrial contamination, including leaking sewer lines and storage areas, discharges, and illegal dumping. Six (6) closures were from leaking underground tanks, eight (8) closures from landfills, five (5) from overdevelopment and septic systems, four (4) from road salt, one (1) from a sewage treatment plant and the remainder as a result of natural conditions or unknown sources (See Table 10).

Private water supplies have been lost to industrial contamination, but are also threatened by pesticides and other agricultural activities. The town of Whately is a community in which pesticides have contaminated so many private wells that special state assistance was required to alleviate the crisis.

Water Supply Management

Nearly every contamination incident is the result of inappropriate land use within a water supply recharge aquifer. Municipalities have not adequately assessed the boundaries of water supply resources or implemented adequate protective measures.

The state needs more funding sources and programs to help assist the municipalities in assessing and protecting their water supplies from contamination. Massachusetts has recently enacted two important laws to bring about comprehensive statewide water management. The Water Management Act will protect present and future users of water by ensuring that water withdrawals do not exceed available supplies. The Interbasin Transfer Act requires that interbasin transfers of water take place only as a last resort after intrabasin sources have been fully utilized.

Much has been accomplished in the last five years to further groundwater protection and clean up in Massachusetts. A 1983 Ground Water Protection Strategy set the organizational framework necessary to identify and effectively and efficiently address matters which affect ground water quality and public health. Within the context of this strategy, new regulatory, financial assistance, and technical assistance programs have been developed and implemented. Closed and contaminated water supplies have been treated, local land use controls have been strengthened, and grants for the purchase of land to protect wells have been distributed. These programs and grants have resulted in bringing 26% of the closed municipal supplies back on line and slating an additional 17.6% for reactivation. Some communities are involved in legal battles to recover costs for clean up or lost supplies while other communities chose to join the Metropolitan District Commission.

Municipalities in Massachusetts have the responsibility of managing their own water resources. In order to protect water supplies for present and future use, every municipality should implement management practices including local zoning to protect recharge areas, land use restrictions, leak detection with repair programs, proper septic system maintenance, underground storage tank regulations and more dependence on its own water resources.

The EPA has recently promulgated new and more restrictive drinking water standards under the 1986 amendments to the Safe Drinking Water Act. Many predict these standards may result in the closure of up to an additional 100 municipal wells costing millions of dollars for clean up and treatment.

The following is a list of Water Supply Funding programs:

Public Buildings Water Conservation Grants Program: Under Chapter 286, Sections 16 and 17, Acts of 1982, $2.5 million has been offered to cities, towns, districts, counties, and the Division of Planning and Operations to purchase water conserving devices to be installed in publicly-owned buildings. Each grant award must be matched by an equal amount appropriated by the grantee.

Leak Detection and Systems Rehabilitation Programs: This program was initiated under Chapter 805, Acts of 1979, continued and expanded under Chapter 286, Section 14, Acts of 1982, and extended by Chapter 786, Section 2, Acts of 1985. A total of $95 million has been earmarked by the three chapters for detection of excessive water losses from pipes and for repair and rehabilitation of water systems as necessary. This detection program can translate into savings of millions of gallons of water and thousands of tax dollars in a single community.

Drinking Water Facility Construction Grants Program: A total of $100 million has been made available under Chapter 286, section 23, Acts of 1982, which amends Chapter 406 of the Acts of 1978. The amendment provides assistance in the form of matching grants for eligible costs to municipal water systems for the construction of filtration plants. These water treatment facilities have benefitted many communities, ensuring the provision of potable water supplies for present and future needs.

Aquifer Land Acquisition Program: Because many communities that rely on groundwater for water supplies cannot afford to set aside lands for additional protection of existing wells, Chapter 286, Section 20, of other Acts of 1982, and Chapter 723 of the Acts of 1983, together allocated $14.25 million in funding for the purchase of lands to protect groundwater quality. This program looks to the future as it promotes additional groundwater management measures as a condition of approval.

Cleanup of Contaminated Water Supplies Program: $10 million was provided by Chapter 286, Acts of 1982, and an additional $5 million by Chapter 786, Acts of 1985, for the mitigation of adverse impacts of water supply contamination. The funds may be used for hydrogeological studies, investigation and implementation of treatment alternatives, and contaminant plume management.

Residential Water Conservation Grants Program: $1 million in water conservation grants have been offered to Massachusetts cities and towns to purchase water saving devices to be sold at cost to residential water users. Under the guidelines of this program, which is funded under Chapter 241, Section 2, grant awards must be matched by an equal amount appropriated by the grantee.

Meter Modernization Grants Program: Under Chapter 786, Section 5, Acts of 1985, matching grants totalling $15 million are available to cities, towns, districts, and water and sewer commissions for the installation of water meters, rehabilitation or replacement of existing meters, and the installation of meters for use by more than one public utility.

Collection System Grants Program: $52 million has been appropriated by Chapter 786, Section 1, Acts of 1985 for no more than 50% of the construction costs of public collection systems. This program is an extension of an existing program and has resulted in significant improvements in recreational facilities, elimination of health hazards, and increased protection of water supplies.

* Source: Special Legislative Commission on Water Supply. Contamination in Municipal Water Supplies. December 1986.

TABLE 9

SUBSTANCES CONTAMINATING GROUNDWATER WATER SUPPLIES

	# of Municipalities Contaminated		# of Municipalities Contaminated
Organic Chemicals:			
Volatile	20	Pesticides	2
Synthetic	3	Petroleum Products	5 (4 are threatened)
		Metals	5
		Coliform	1
Inorganic Chemicals:			
Nitrates	1		
Salinity	5		
Calcium Carbonate	1		

TABLE 10

NUMBER OF WELLS CLOSED AND POLLUTANT SOURCE

HOW CONTAMINANT DISCOVERED

SOURCE OF CONTAMINANT	ROUTINE SAMPLING	SPOT PROGRAM	CITIZENS	OTHER MONITORING	NOT LISTED	TOTAL
Uknown Source	3	2	-	5	4	14
Landfill	4	-	1	3	-	8
Road Salt	3	-	-	-	1	4
Leaking Sewer Lines	-	-	1	1	-	2
Overdevelopment	1	1	-	-	-	2
Illegal Dumping	-	1	1	2	-	4
Sewage Treatment Plant	-	-	-	1	-	1
Leaking Gasoline Tank	-	-	3	3	-	6
Natural Conditions	-	-	2	-	3	5
Agriculture	2	-	-	-	-	2
Industrial Storage/ Discharge	-	3	-	-	-	3
Septic Systems	2	-	-	1	-	3
TOTAL	15	7	8	16	8	54

FIGURE 5

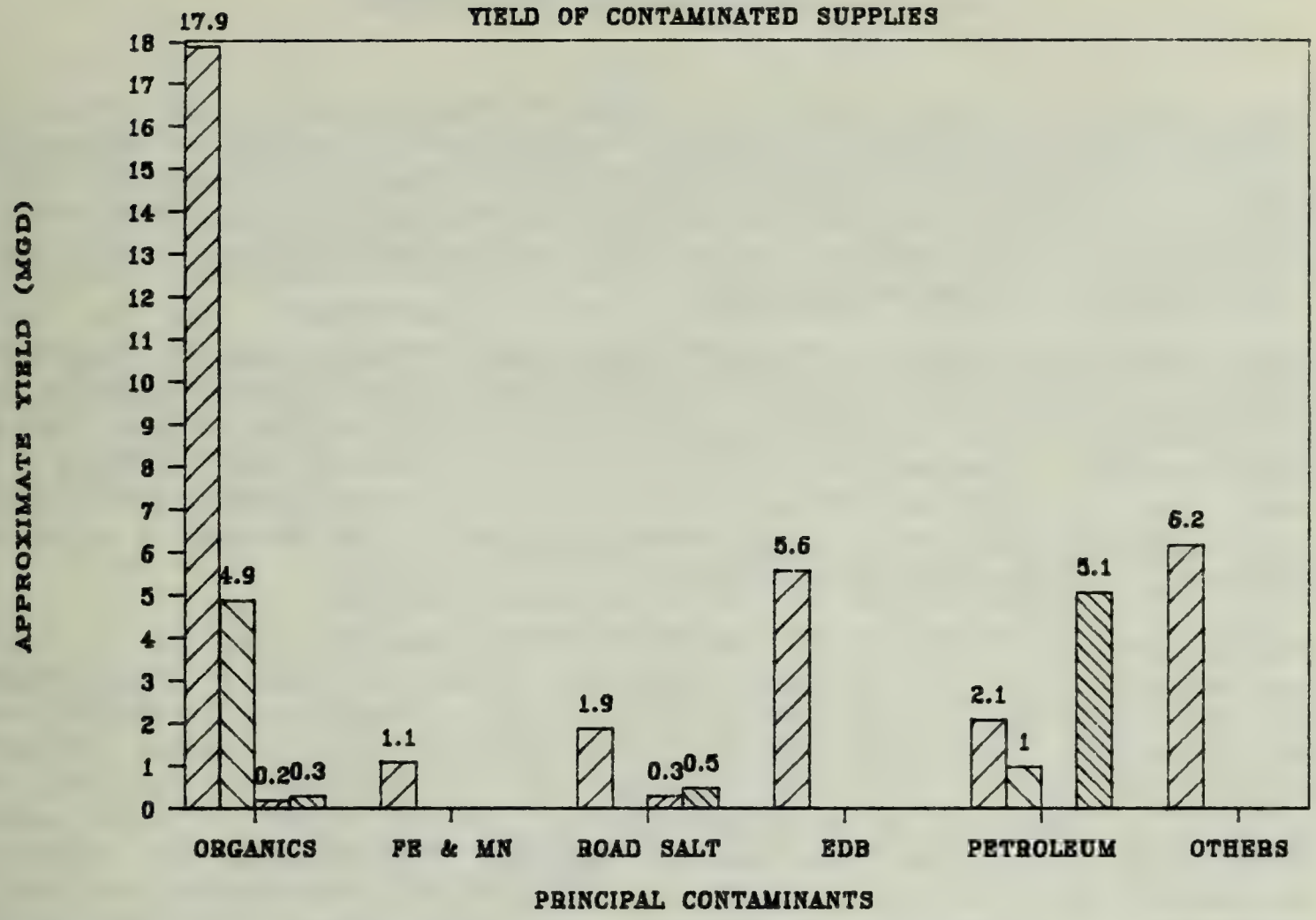
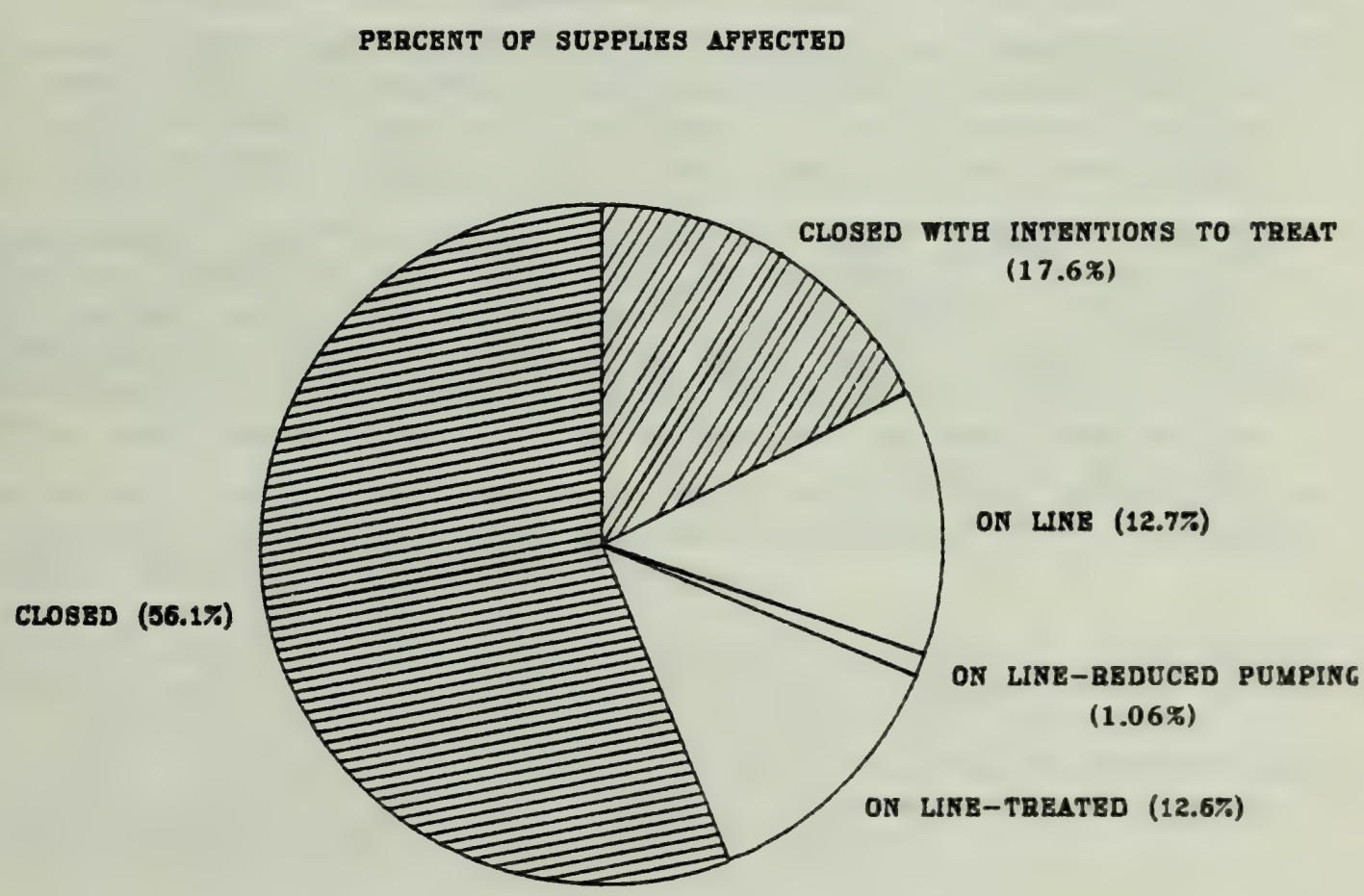


FIGURE 6



STATE ENVIRONMENTAL CODE

Approximately thirty per cent of the homes in Massachusetts are currently using individual subsurface sewage disposal facilities to dispose of sewage on the property. In addition, there is an unknown number of commercial and other small buildings, such as restaurants, nursing homes, garages, offices and light manufacturing plants without access to a public sewer system, and, therefore, using this type of sewage disposal.

Large numbers of homes are being constructed in Massachusetts, many of which are located in suburban and rural communities without a public sewerage system, or in sections of a partially-sewered city or town where no public sewer has been extended. Because of the high cost of financing and building a public sewer, and in light of "Proposition 2-1/2," it appears that few communities will undertake this costly public works program in the absence of major sewage, drainage, or water pollution problems.

The purpose of Title 5 of the State Environmental Code is to provide a comprehensive body of minimum standards, which if fairly administered and strictly enforced, will provide protection of the public health and the environment in all cities and towns of the Commonwealth where circumstances require the use of individual systems for the disposal of sanitary sewage. Title 5 is intended to bring uniformity in the manner in which subsurface sewage disposal systems are located, designed, constructed and inspected for the benefit of home owners, engineers, sanitarians, contractors and the public in general. Title 5 is a body of regulations based on proven scientific principles and tested methods for the design, construction, maintenance and repair of individual subsurface sewage disposal systems under a wide range of conditions likely to be found throughout the Commonwealth.

The Department recognizes that specific, identifiable local conditions may require more stringent regulations to protect these interests, however, in the absence of such specific conditions, the provisions of Title 5, when properly administered and enforced, should afford adequate protection to the community.

Boards of health have the authority and the legal responsibility to enforce Title 5 of the State Environmental Code. Board members may delegate authority to agents to enforce Title 5, however, the ultimate responsibility still lies with the Board. Local Boards of Health also have authority to promulgate rules and regulations relating to house drainage and the disposal of sewage. Such regulations must be reasonable and in no instance less stringent than the provisions of Title 5.

GROUNDWATER DISCHARGE PERMIT PROGRAM

On October 15, 1983, The Massachusetts Department of Environmental Quality Engineering (DEQE), Division of Water Pollution Control, promulgated two regulations establishing the Massachusetts Groundwater Discharge Permit Program and the Massachusetts Groundwater Quality Standards. These two regulations, respectively, identified as Title 314 of the Code of Massachusetts Regulations, Chapters 5.00 and 6.00 (314 CMR 5.00 and 6.00) were designed to protect of all groundwaters of the Commonwealth. Major features of the regulations include a state-wide groundwater classification program and groundwater discharge permit enforcement authority. Under the former, a mechanism has been created for other classification of the Commonwealth's groundwaters with respect to protecting its most sensitive use. The three classes of groundwaters are:

Class I: Fresh groundwater found in the saturated zone of unconsolidated deposits or unconsolidated rock and bed rock and designated as a source of potable water supply.

Class II: Saline waters found in the saturated zone of the unconsolidated deposits or consolidated rock and bedrock are designed as source of potable mineral waters, for conversion to fresh potable waters, or as raw material for the manufacture of sodium chloride or its derivatives or similar products.

Class III: Fresh or Saline waters found in the saturated zone of unconsolidated deposits or consolidated rock and bed rock and are designed for uses other than that as a source of potable water supply. At a minimum, the most sensitive use of these waters is as a source of non-potable water which may come in contact with, but is not ingested by humans.

Under 314 CMR 6.00, persons desiring a particular classification for a groundwater were given until January 1, 1985 to submit a petition of request to DEQE. DEQE is currently reviewing all such requests and will assign classifications based upon the submitted data. Groundwaters for which no specific classification petitions have been received will be designated as Class I, thereby affording protection to the most sensitive use - drinking water supply.

Reclassification may also be initiated by a petition which can be accepted at any time. Currently, 77 such petitions have been processed by the Department. Four (4) Class III designations have been granted.

All petitions must include certain minimum information including a description of the existing groundwater quality, current and potential uses of the groundwaters, identification of potentially affected water supplies, and a statement of need. Petitioners may also be required to submit a hydrogeologic study, the required detail of which will depend on the complexity of the area's geology, hydrology and the potential environmental impacts.

Standards for granting a Class III designation include the following:

1) The groundwater impacted by the classification is under single ownership by the discharger proposing the classification; or

2) The groundwater affected by the classification is not a present or potential source of drinking water because;

   a) the depth of location of the groundwater makes its use as drinking water economically or technologically infeasible; or

   b) the groundwater is sufficiently contaminated to make its recovery for drinking water use economically or technologically infeasible; or

   c) the discharge is located over a federally-defined Class III well mining area subject to subsidence or catastrophic collapse; or

3) The groundwater affected is a potential source of drinking water, but an alternate source is available and will be provided by the discharger proposing the classification to all existing and potential users of the aquifer affected by the discharge.

Furthermore, once all the above have been fully satisfied, the state will consider potential adverse effects on hydrologically connected surface and groundwaters. The state must take into account future as well as present uses of adjacent water and groundwater.

Currently, the protection of groundwater from point sources of pollution is accomplished through the Departments Groundwater Discharge Permit Program administered by the Division of Water Pollution Control. All dischargers of pollutants into the groundwaters require a wastewater discharge permit. This includes, but is not limited to: facilities discharging a liquid effluent below the land surface or into a percolation pit, pond or lagoon; facilities discharging a liquid effluent into leaching pits, galleries, chambers, trenches, fields and pipes; facilities discharging a liquid effluent into an injection well; any facility with an unlined pit, pond, lagoon or surface impoundment in which wastewaters or sludges are collected, stored, treated or disposed of; or conveyances that collect and convey stormwater runoff contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances or contact with a leaching facility. Since adoption of the 1983 regulations, the Department has received 405 permit applications and has issued approximately 311 final permits.

Discharges to Class I and Class II groundwaters must meet the more stringent of either the technology standards or the national primary and secondary drinking water standards. For parameters for which there are not drinking water standards, USEPA Health Advisories are used as effluent concentration guidelines. Compounds which are considered toxic and for which there is neither a water quality standard nor a health advisory, are prohibited from discharge.

The discharge of sanitary wastewater in excess of 15,000 gallons-per-day requires a minimum of secondary wastewater treatment or its equivalent. All industrial process wastewater discharges are required to meet technology standards and the proposed treatment system must receive Department approval. These measures serve to ensure that the permitted discharge will be in compliance with Class I or Class II standards.

Discharge to Class III groundwaters must also meet the more stringent of technology standards or water quality standards, but water quality standards for Class III groundwaters are determined on a case-by-case basis and are generally less stringent than those for Class I or Class II aquifers. Water quality standards for Class III groundwaters are determined based upon two most sensitive identifiable water uses. At a minimum, Class III groundwaters must meet water quality criteria based upon human exposure limits.

In Massachusetts, each permit must contain monitoring requirements to assure compliance with permit limitations and conditions. The Department of Environmental Quality Engineering determines the number of wells, location, dimensions, method of construction, and frequency of reporting on a case-by-case basis. The State has established guidelines for making these determinations, and the guidelines vary according to the type of facility and the aquifer type under consideration. For Class I and Class II groundwater, most of the monitoring will occur at the point where the effluent emerges from a treatment works, disposal system, outlet or point source prior to being discharged into the ground. For Class III groundwater, the state will require monitoring between the point source and the compliance boundary.

An integral part of the groundwater discharge permit program is the permit review process which encompasses all the divisions within the Department such as Water Supply, Water Pollution Control, and Hazardous Waste. The review process ensures that the environmental concerns particular to each division within the Department are considered and addressed.

Implementation of the Department's Administrative Penalty Program began on September 2, 1986. Authority granted under the Administrative Penalty Statute allows the Division to assess civil penalties up to $25,000 per day of violation per violation of permit limitations as well as unpermitted discharges. In excess of $300,000 has been assessed by the groundwater section in a total of 17 cases. This program has proven to be a very effective tool in addressing non-compliance cases as well as providing an extra incentive to permittees to maintain compliance.

DWPC GROUNDWATER REGULATION SECTION 1986 & 1987

January 1, 1986 - January 1, 1988

GROUNDWATER DISCHARGE PERMIT PROGRAM

Applications received	126
Permits drafted	115
Permits issued	75
WWTF's inspected	53

ENFORCEMENT

DWPC Notices of Compliance	31
WPC Administrative orders issued	22
WPC Penalty assessments issued	17
Cases referred to A.G.	12

TITLE 5

Title 5 systems - plan review	1,458
Variances processed	1,036

SOLID AND HAZARDOUS WASTE PROGRAMS

The Division of Solid and Hazardous Waste was established by the Legislature in November 1979 for the purpose of developing, implementing and enforcing a hazardous waste regulatory program that encourages sound management and safe treatment of hazardous waste. The Division was split in January 1, 1987 into the Division of Hazardous waste and the Division of Solid Waste Management.

DIVISION OF HAZARDOUS WASTE

The Division of Hazardous Waste includes two major program areas: The Hazardous Waste Regulatory Program and the Massachusetts Superfund Program. An important aspect of each of these programs is the protection of the Commonwealth's water resources from contamination by releases to the environment of oil and hazardous wastes. Both programs are described briefly below.

A. Hazardous Waste Regulatory Program

This program aims to prevent future contamination of water and other resources by requiring proper management of hazardous wastes produced today. This has been approached through a regulatory program which includes a "cradle-to-grave" system for tracking hazardous waste from its site of generation to final disposal, and requirements for managing hazardous wastes to ensure that daily industrial operations do not cause future pollution problems. For facilities which manage hazardous waste, regulations prescribe a series of design and performance standards that ensure safe treatment, storage and disposal.

To ensure that these regulations are followed, this program regulates over 10,400 Massachusetts waste generators, and issues licenses to 140 transporters and 35 facilities if applicants demonstrate they meet all substantive and financial requirements. Water resource protection is addressed specifically through regulatory standards which require the evaluation of groundwater impacts resulting from land treatment and disposal of hazardous waste. Eighteen current and former land treatment and disposal facilities are being monitored by this program.

Laws, Regulations and Publications

- M.G.L. c. 21C, the Massachusetts Hazardous Waste Management Act
- M.G.L. c. 21D, s. 150(B), Site Assignments for Hazardous Waste Management Facilities
- 310 Code of Massachusetts Regulations 30.000, Hazardous Waste Regulations
- Lists of Licensed Transporters and Hazardous Waste Treatment, Storage and Disposal Facilities
- Guidelines for Small Quantity Generators and Fact Sheets describing specific requirements (e.g., specific industry guidelines, the manifest system, obtaining an identification number, licensing requirements) are also available from DHW.

B. Massachusetts Superfund Program

Under the Massachusetts Superfund Program, the Office of Incident Response contains and mitigates environmental damage caused by spills of oil and hazardous materials and at sites where dumping has occurred in the past. The Emergency Response Program responds to spills, evaluates actual or potential environmental damages, and provides resources for clean up via the Massachusetts Emergency Response Team (when the responsible party fails to act in a timely manner) and technical assistance to local officials.

This office is also investigating and assessing sites where hazardous waste or materials have been released and supervises the design and implementation of remedial measures at each site (including the 21 Massachusetts sites on the National Priority List). Enforcement efforts include the recovery of costs expended by the state to clean up these sites and spills from those responsible for the contamination. All of the spills and sites which this office addresses have the potential to affect water quantity in the Commonwealth.

Laws, Regulations and Publications

- M.G.L. c. 21E, Massachusetts Oil and Hazardous Material Release Prevention and Response Act of 1983.
- List of Confirmed Disposal Sites and Locations To Be Investigated
- Fact Sheets describing environmental problems and planning for remedial measures at selected hazardous waste sites
- Massachusetts Contingency Plan (promulgated expected March 1988)
- Spill Notification Regulations (promulgation expected March 1988)

DIVISION OF SOLID WASTE MANAGEMENT

The Division of Solid Waste Management was formed January 1, 1987 when the DEQE Division of Solid and Hazardous Waste split and the DEM Bureau of Solid Waste changed agencies to join DEQE. The Division of Solid Waste Management currently has three sections: the Compliance and Enforcement Section, the Policy and Regulatory Section, and the Municipal Assistance Section.

The Compliance and Enforcement section is involved in aiding the regional offices with technical questions and with inspections and enforcement. The Policy and Regulatory section is writing a new set of regulations for landfills, transfer stations, recycling facilities, composting facilities and resource recovery facilities. The first set of general regulations and landfill regulations are currently being written and reviewed by the Solid Waste Advisory Committee. It is hoped that these first two sections can be promulgated by July 1988. The Municipal Assistance section will administer the grants and loans program included in the Solid Waste Act of 1987. This act provides money to cities and towns for closure of existing landfills, establishment of regional solid waste facilities and to develop composting and recycling programs. A landfill assessment program, also included under the Municipal Assistance program, will seek to assess and clean up existing landfills, the major goal being that of groundwater protection.

In 1986 there were 193 active landfills. As many as 40% were said to be polluting or threatening to pollute the nearby groundwater and/or surface waters. Eight communities have closed their public (ground) water supplies due to landfill leachate contamination, and five former landfills are currently listed as Federal Superfund Sites.

Landfills are a major threat to groundwater quality. With the formation of the Division of Solid Waste Management major changes and improvement should occur in protecting the groundwater as a result of new and more stringent regulations and through the grants and loans to be provided to cities and towns to clean up and close landfills.

WATER POLLUTION CONTROL PROGRAMS

MUNICIPAL FACILITIES BRANCH

Construction Grants section of the Division of Water Pollution Control administers grants to municipalities for initial planning, design and construction of new wastewater treatment facilities, or the upgrading of older facilities which are not meeting their NPDES permits. Ninety percent state-only grants are made for the preliminary and final planning steps. Under the joint EPA/State program, the federal and state shares are 35% and 55%, respectively. The local share is 10% of construction costs and full responsibility for operation and maintenance of the POTW's. Massachusetts receives $82 million annually as its allocation of the $2.4 billion national appropriation. This allocation, however, falls far short when compared to the current statewide inventory of unfunded projects which approaches $5 billion.

In an effort to effectively respond to the tremendous backlog of outstanding municipal wastewater needs, Chapter 786 of the Acts of 1985 provided $357 million over the next several years as follows:

A) $225 million for the state to match the EPA grants;

B) $80 million for a state-only 70% grant program to be matched by a 30% local share; and

C) $52 million additional funds (over and above the present $12 million per year) to fund 50% state-only grants for collection sewers and economic benefit projects (such as sewering industrial parks).

One of the most significant provisions of this law allows the state share to increase to 55% and reduce the EPA share to 35%. With this state funding it is possible to accelerate the EPA/State grant program to commence construction on approximately $600 million of water pollution control projects by 1990.

In the longer term, the Commonwealth must proceed with the design and implementation of a financing mechanism for the construction of publicly-owned wastewater treatment plants and related projects to promote the achievement of the Commonwealth's water quality objectives. Pursuant to the federal Water Quality Act of 1987, federal grant assistance for this purpose is ending. Federal assistance in the form of grants to states to capitalize state revolving funds will be available in annually decreasing amounts through fiscal 1994. Thereafter, no federal assistance is authorized. In planning to meet the Commonwealth's water quality objective, a mechanism is needed to assist local entities to meet the financing needs of publicly-owned wastewater treatment facilities and related projects, including, but not limited to, facilities to be constructed to abate pollution of Boston Harbor, for the protection of groundwater resources, and ocean sanctuaries, the correction of combined sewer overflows, the ensurance of municipal compliance, with discharge permit requirements and other very sensitive environmental problems.

Title VI of the Federal Water Quality Act of 1987 provides for the creation of state revolving funds, capitalized by federal and state contributions, to provide loans to local entities for this purpose. The provisions of this Act allow states broad latitude in the design of a state revolving fund. A careful

assessment is being made to evaluate alternate forms of structuring, capitalizing and operating a financing mechanism which will qualify as a state revolving fund under the terms of the Clean Water Act.

In addition to the federally participating wastewater treatment grant program the Commonwealth provides state funded construction grant assistance to local public entities for other wastewater projects such as: removal of infiltration and inflow from local systems; construction of collection sewers; and construction of federally-eligible wastewater treatment plants or projects, principally in smaller communities, whose priority ranking in the federal program tend to be too low to receive any of the available funding. The integration of the financing program for the currently federal grant-eligible wastewater treatment plant construction projects with these closely related, complementary state programs is a significant factor in determining future program direction.

In summary, the success of this program has been dramatic. Through the investment of approximately 2.5 billion dollars in federal/state/local funds over the past several years, water quality has improved from 444/444/723 miles (supporting classification/partially supporting/not supporting) in 1972 to 713/598/335 in 1988. The quality of industrial discharges has improved because treatment facilities have been built and upgraded, companies have tied into municipal sewerage systems or companies have relocated. The major problems with industrial discharges are toxics, treated plating wastes discharging to low flow streams, and the need for better pre-treatment. Significant segments of the Assabet, Hoosic, Millers, Charles and Merrimack Rivers have improved dramatically due to municipal facilities construction. This progress must be continued if a healthy and sound environment is to be provided for the citizens of this Commonwealth, both now and in the future.

INDIRECT PERMITS AND PRETREATMENT

Indirect permitting includes permits for discharges to publicly owned treatment works (POTW's) through the regulation of sewer connections and extensions in conformance with the requirements of 314 CMR 7.00.

Industrial facilities which discharge toxic wastes, wastes not compatible with domestic wastes, or unusually high concentrations of conventional wastes to WWTP's must provide pretreatment prior to the wastes entering the municipal system. Currently 41 communities have been required by EPA General Pretreatment Regulations and Massachusetts Regulations (314 CMR 12.00) to implement pretreatment plans at their wastewater treatment plants.

TECHNICAL ASSISTANCE AND TRAINING

The Technical Assistance and Training Section (TATS) is responsible for providing technical assistance and training to wastewater treatment plant operators throughout the Commonwealth.

The Technical Assistance section focuses on locating problem plants and documenting assistance provided to them. Documentation includes an assessment of the problem, actions taken, recommendations made, and the results of corrective measures employed. Responsibilities of the section are to perform diagnostic evaluations; on-site assistance to improve performance; operation, maintenance, and staffing evaluations; follow-up site inspections to determine the efficiency of plant performance after assistance efforts; and in general to increase the number of facilities in compliance with their NPDES permits. The section is also responsible for the review of operation and maintenance manuals as related to 314 CMR 12.00. This regulation established procedures for proper operation of treatment works and certification of staffing, sewer system extensions and connections, pretreatment, sampling, analysis of record keeping and safety. Additional tasks of this unit include coordinating Departmental review and comments on bids, proposals, and agreement for contract operations and cooperating with the Board of Certification and regional offices to evaluate treatment plant personnel and operation, ensuring proper levels of certified staff and assigning grade levels to plants based on size and complexity. The section has inaugurated a "Hands-On" laboratory training course for treatment plant personnel.

The training program for wastewater operators teaches a Basic and Intermediate course in wastewater treatment plant operations, each offered twice at rotating locations around the state. Seminars are planned on a number of wastewater treatment topics in the areas of operations, laboratory procedures, management, and plant equipment maintenance. The training program includes use of an in-house computerized treatment plant simulator. This is used by treatment plant personnel who come to the office for individualized instruction and then "Hands-On" training with the plant simulator. In FY87, the Training section participated in developing and presenting a major Title 5 training program for town health officials. The Title 5 training program will be institutionalized in FY '88. In addition to these major assignments, the training section assists with review of the operators certification exam, plant operation and maintenance manuals. Section members serve on the boards of several organizations that are involved with providing environmental training courses.

LAKE POLLUTION CONTROL PROCEDURES AND RESTORATION PLAN

Monitoring Program

The Division's Lakes Water Quality Monitoring Program was formally initiated in the summer of 1974 and has significantly expanded its scope over the past decade. Limnological sampling is conducted a) to determine baseline lake conditions, b) to monitor post-implementation projects and c) to respond to public concerns about lake problems.

A baseline survey is generally conducted in one day and consists of bathymetric mapping of the lake; physical, chemical and biological sampling of the open water areas, tributary stream(s), and outlet; and a quantitative and qualitative mapping of the aquatic macrophyton community in the lake. The primary purpose of this survey is to estimate lake trophic status and identify any point and nonpoint sources of pollution. The lake is sampled during the summer months when productivity is high.

Post-implementation or post-construction monitoring is conducted generally over a three year period to evaluate the effectiveness of a lake restoration project. The monitoring program is individually tailored to the specific implementation project. The sampling schedule, stations and parameters, therefore, are selected accordingly.

Water Quality Standards

Some control over pollution sources to lakes is provided under the Massachusetts Surface Water Quality Standards Program. The Division of Water Pollution Control adopted these standards to enhance the quality and value of the water resources of the Commonwealth. Under these standards no new or increased discharges of nutrients are allowed to lakes and ponds or to their tributaries. Addionally, activities which may result in nonpoint discharges of nutrients are required to be conducted in accordance with best management practices determined by the Division to be necessary to precede or minimize such discharges of nutrients. A further description of these standards can be found in Appendix I.

Clean Lakes Program

The Commonwealth is mandated by the Federal Water Pollution Control Act to restore and maintain the chemical, physical and biological integrity of waters within the Commonwealth. Section 314 of the Clean Water Act establishes policies and procedures by which the Commonwealth may enter into cooperative agreements to restore publicly owned freshwater lakes and ponds and protect them against degradation.

The Division has developed and administers the Massachusetts Clean Lakes Program. The purpose of this program is to restore, preserve or maintain the Commonwealth's publicly owned lakes and ponds for recreation and enjoyment.

The goals of the program are threefold:

(a) To diagnose degraded lakes and ponds and implement, on a priority basis, long-term solutions for the purpose of restoring their water quality. These long-term solutions must be shown to be feasible, cost-effective, and environmentally sound.

(b) To diagnose lakes and ponds and implement, on a priority basis, methods for the long-term preservation of their water quality. This long-term preservation must be shown to be feasible and cost-effective.

(c) To provide short-term remedial actions, on a priority basis, that relieve severe problems of nuisance aquatic macrophyton and/or phytoplankton and that maintain water quality conditions adequate for public recreation and enjoyment.

Each restoration, preservation, or maintenance project includes a watershed management plan to control and reduce nutrient and/or sediment loading to the lake/pond, wherever possible, through best management practices.

Guidelines have been issued by the Commissioner of the Department of Environmental Quality Engineering under the authority of Chapter 628 of other Acts of 1981 (known as the Massachusetts Clean Lakes and Great Ponds Program), Chapter 286 of the Acts of 1982 (which provides funding for Chapter 628) and Chapter 722 of the Acts of 1969 (known as the Eutrophication and Aquatic Vegetation Control Program). These guidelines constitute a uniform and comprehensive program for the restoration, preservation and maintenance of the publicly owned lakes and ponds of the Commonwealth for public recreation and enjoyment. They establish policies and procedures by which applicants may apply for assistance to carry out approved methods and techniques for the above purposes.

A further description of the program may be found in the Clean Lakes Program Guidelines.

Water Quality Trends

The natural process of eutrophication in many lakes and ponds throughout the Commonwealth has been accelerated by watershed development and recreational use. The primary cause of the accelerated eutrophication is the uncontrolled addition of nutrients to lakes or ponds which stimulates primary productivity by algae and/or shore plants (macrophyton). The sources of these nutrients are chiefly nonpoint in origin. Septic system leachate and stormwater runoff appear to be the major sources. Watershed development may also accelerate the sedimentation rate in lakes and ponds due to erosion and/or the transport of materials originating in the watershed.

This cultural eutrophication can result in nuisance growths of aquatic macrophyton and/or phytoplankton which may hinder the recreational use of the waterbody and may even pose a health hazard to the general public.

Toxic Substance Control/Acid Mitigation Activities

The state of Massachusetts Pond and Lake Information System (PALIS) database was used to generate a listing of state lakes and ponds with a surface pH less than 4.5. Only nine lakes emerged as having a pH of 4.5 or less (Appendix II, Table 1) on at least one sampling occasion.

Many changes in aquatic biota, however, occur as pH levels drop below 6.0. One factor which influences in-lake pH is buffering capacity. Buffering capacity, or the ability of a lake to withstand pH changes, can be measured by total alkalinity. The Massachusetts Division of Fisheries and Wildlife (DFW) has established three categories based on total alkalinity values to determine a lake's susceptibility to acid inputs.

These categories are:

Category	Total Alkalinity ($CaCO_3$)
Vulnerable	6-10 mg/l
Endangered	3-5 mg/l
Critical	≤2 mg/l.

Again using the PALIS data 27 lakes were identified in the "Critical" category (Appendix II, Table 2). An in-lake total alkalinity value of less than 2.0 mg/l was obtained on at least one sampling occasion for each lake in this list. Furthermore, 63 "Endangered" lakes (Appendix II, Table 3) and 192 "Vulnerable" lakes (Appendix II, Table 4) were identified. "Endangered" and "Vulnerable" lakes, while not as susceptible to acidic inputs as "Critical" lakes still have a limited buffering capacity.

Together, Tables 1 through 4 (Appendix II) indicate that approximately 191 surveyed Massachusetts lakes either have been impacted by or are susceptible to acidic inputs. In comparison, the Acid Research Monitoring Project at the University of Massachusetts which randomly samples Massachusetts lakes and ponds quarterly has identified 44 lakes where a pH of 4.5 or less was measured at least once since 1985. Also, the Acid Research Monitoring Project obtained Acid Neutralizing Capacity (ANC) values less than 8.0 at 557 lakes (an ANC value of 8.0 is roughly equivalent to a total alkalinity value of 10.0 mg/l). The above totals should be considered as maximum values since only one low pH or alkalinity value would make a lake eligible for these lists.

Acid Mitigation

The Massachusetts Generic Environmental Impact Report, "Statewide Liming of Acidified Waters, 1985," stresses that "....the addition of ground limestone is the most biologically, socially and economically acceptable method for mitigating this problem (high acidity)." Lakes selected for liming by Massachusetts Department of Fisheries and Wildlife must meet each of the following nine criteria;

1) total alkalinity of 2 ppm or less;
2) treat only great ponds or waters with a legal public access;
3) dystrophic lakes are excluded from treatment;
4) the lake's retention time must be one year or longer;

5) metals concentrations must be below toxic levels;
6) the lake bottom cannot be dominated by mud or organic matter;
7) mean depth must be eight feet or more and the maximum depth must be eighteen feet or more for a normal dose;
8) all waters must be screened by the Natural Heritage Program for rare and endangered plants; and
9) liming must be the most cost effective treatment.

One exception should be noted, however, that is, lakes which have "put and take" sport fisheries or important genetic stocks may be treated even if they do not meet all of the above criteria.

During 1986, Massachusetts Division of Fisheries and Wildlife, in conjunction with Living Lakes, a private corporation, limed nine ponds. During the next two years (1988-89) Massachusetts Division of Fisheries and Wildlife anticipates six more ponds, at a maximum, will be limed utilizing only state monies.

Toxic Control

As stated in the liming selection criteria, the Massachusetts Division of Fisheries and Wildlife will not lime a lake if metal concentrations are above toxic levels. To date neither the Division of Fisheries and Wildlife nor the Department of Environmental Quality Engineering, Division of Water Pollution Control have developed mitigation methods or established plans to control toxics or metals mobilized by high acidity. Both agencies, however, have implemented sampling programs to monitor toxics in the environment. Currently these programs, stressing the public health concerns of environmental toxics, focus on locating areas of high concentrations and limiting the discharge of toxics to prevent toxic mobilization.

Cost Estimates

Cost estimates for liming operations were provided by the Department of Fisheries and Wildlife. Limestone application costs range from $100 per acre for bags of agricultural limestone distributed by boat to over $200 per acre for a "high tech" application of limestone slurry by helicopter. The three liming methods currently utilized in Massachusetts and their respective costs (not including permits and monitoring) are:

1) agricultural limestone - using small boats, bags of unrefined agricultural limestone are simply emptied into a lake. While materials are relatively cheap ($30/40 acre) this is a very labor intensive method.

Total Cost - $100/acre

2) slurry box - bags of refined limestone are emptied into a hopper (slurry box) mounted on a modified barge. Adding lake water, a slurry is formed on-board and then dispensed in-lake. A "moderate" amount of labor is involved and materials cost $40-50 per acre.

Total Cost - $90-100/acre

3) limestone slurry - pre-mixed limestone slurry is loaded directly into a dispenser on-board a barge from tank trucks. This method utilizes the least amount of labor but the slurry costs approximately $60-70 per acre.

Total Cost - $80-90/acre

The current composite figure used to estimate costs by the Massachusetts Division of Fisheries and Wildlife to estimate costs for all sized ponds is $110 per surface acre. The preferred treatment method is a limestone slurry distributed by barge/boat. This figure includes permits but does not include follow up monitoring.

NONPOINT SOURCE POLLUTION

Nonpoint sources (NPS) of pollution affect 682.8 miles (41.5%) of the rivers and 112.26 square miles (65.8%) of the estuaries assessed (see Tables 4 and 5). Agricultural and urban runoff, in-place sediments, failing septic systems, boating discharges and natural conditions were the leading sources of nonpoint pollution. Illegal discharges, landfills and leachate were also significant NPS pollutant contributors. Nonpoint source pollution is gaining greater attention as point source discharges are slowly being controlled, improved and monitored.

Lakes and ponds are more severely impacted by NPS than rivers in Massachusetts. Direct point discharges to lakes are nearly non-existent; thus watershed management plans to control NPS are an integral part of lake restoration projects. Failing septic systems and surface runoff are the leading nonpoint sources of pollution to lakes and ponds.

Most implementation of NPS control is conducted on a local level, such as, street sweeping, road salt containment and fertilizer application control. New watershed management practices are being implemented by some communities such as underground storage tank regulations, land use restrictions, and septic tank management plans.

Federal and state grants are also contributing to nonpoint source control. Improvements to failing septic systems and leaky sewer lines are being made with the allocation of money for sewer tie-ins. New landfill regulations will provide better control and collection of leachate contamination, preventing volatile organics and metals from entering the groundwater.

Through the Clean Lakes Program, several lakes and ponds are installing nonpoint source controls to reduce the pollutant loadings and improve the water quality. These controls include dam improvements, hypolimnetic withdrawal, lake level drawdown, dredging, stormwater sedimentation and detention basins, and tributary and stormwater diversion.

Nonpoint sources play a major part of the Commonwealth's waters not meeting their support status. Sources are only now being identified and preventative measures being implemented.

Nonpoint Source Control Program

Massachusetts is actively developing a state-wide comprehensive nonpoint source pollution control program. Although many existing environmental programs now include or somehow relate to nonpoint sources of pollution, the current effort will have this issue as its prime focus. An assessment report is included in Appendix IV. The state assessment report includes the following four categories of information:

(A) Navigable waters within the state which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain applicable water quality standards or the goals and requirements of the Act.

(B) Categories and subcategories of nonpoint sources or, where appropriate,

particular nonpoint sources which add significant pollution to each portion of the navigable waters identified under subparagraph (A) in amounts which contribute to such portion not meeting such water quality standards or such goals and requirements.

(C) The process, including intergovernmental coordination and public participation, for identifying best management practices and measures to control each category and subcategory of nonpoint sources and, where appropriate, particular nonpoint sources identified under subparagraph (B) and to reduce, to the maximum extent practicable, the level of pollution resulting from such category, subcategory or source.

(D) State and local programs for controlling pollution added from nonpoint sources to, and improving the quality of, each such portion of the navigable waters, including but not limited to those programs which will receive federal assistance under subsection (h) and (i). (Section 319 subsection (h) and (i) refer to grant programs for management programs and protecting groundwater quality respectively).

As a second step, by August 1988, there will be a management program in place. The State Management Program will include the following six categories of information:

(A) Best management practices and measures which will be used to reduce pollutant loadings resulting from each category, subcategory, or particular nonpoint source designated in the State's Assessment Report, taking into account the impact of the practice on groundwater quality.

(B) Programs (including, as appropriate, nonregulatory or regulatory programs for enforcement, technical assistance, financial assistance, education, training, technology transfer and demonstration projects) to achieve implementation of the best management practices designated under subparagraph (A).

(C) A schedule containing annual milestones for (i) utilization of the program implementation methods identified in subparagraph (B), and (ii) implementation of the best management practices identified in subparagraph (A) by the categories, subcatagories, or particular nonpoint sources designated in the State's Assessment Report. Such schedule shall provide for utilization of the best management practices at the earliest practicable date.

(D) A certification by the attorney general of the state that the laws of the state provide adequate authority to implement such management program.

(E) Sources of federal and other assistance and funding (other than assistance provided under subsections (h) and (i)) which will be available in each of such fiscal years for supporting implementation of such practices and measures and the purposes for which such assistance will be used in each of such fiscal years.

(F) The federal financial assistance programs and federal development projects for which the state will review individual assistance applications or development projects for their effect on water quality pursuant to the procedures set forth in Executive Order 12372 as in effect on September

17, 1983, to determine whether such assistance applications or development projects would be consistent with the program prepared under this subsection; for the purposes of this subparagraph, identification shall not be limited to the assistance programs or development projects subject to Executive Order 12372 but may include any programs listed in the most recent Catalog of Federal Domestic Assistance which may have an effect on the purposes and objectives of the state's nonpoint source pollution management program.

Massachusetts expects to receive $400,000 in federal funds for fiscal 1987 to produce the Assessment Report and Management Plan. A similar amount of federal funds for fiscal 1988 as well as potential state funds will afford implementation of prioritized plan recommendations.

MONITORING PROGRAMS

RIVER MONITORING

There are two types of surveys conducted on the rivers of the Commonwealth. These surveys include all major components (including tributaries and wastewater inputs) and are composed of physical, chemical and biological parameters (see Table below). There are synoptic one day, one run surveys of grab samples only, and there are intensive surveys. Intensive surveys consist of round-the-clock sampling for two to three consecutive days for one to two weeks of the summer. The surveys are generally conducted during low flow conditions and samples are usually composited.

TABLE 11
TYPICAL SURVEY ANALYSES

Type	Parameter
Physical	Flow
	Temperature
	Suspended Solids
	pH
Chemical	Dissolved oxygen
	BOD
	Nutrients
	Chlorides
	Trace elements
Biological	Chlorophyll *a*
	Coliform bacteria
	Phytoplankton
	Bentic Invertebrate
	Microtox™
	Fish
Special	Metals
	Organics

River stations are located at dams, above and below discharges, at tributaries, and at impoundments. These locations are chosen to assess the water quality and effects of outside sources and natural changes. Surveys are conducted periodically to update old data and sample rivers before and after a major upgrading of a treatment plant or the addition of a new discharge. The surveys conducted in 1986 and 1987 are listed in Table 12.

Once sampling is conducted four different reports are written: the tabulation of water quality data, wastewater discharge data, a comprehensive water quality analysis and a management plan for the entire river basin.

TABLE 12

1986 AND 1987 RIVER SURVEYS CONDUCTED

YEAR	BASIN	SURVEY
1986	Assabet River	1 survey
	Charles River	2 intensive surveys
	Hoosic River	1 intensive survey
	Merrimack River	2 intensive surveys, 4 surveys
	Muddy River	1 survey
	Mystic River	3 surveys
	Neponset River	3 surveys
	Quaboag River	1 survey
	Sudbury River	3 surveys
	Taunton River	4 surveys
1987	Assabet River	2 intensive surveys, 11 surveys
	Charles River	2 intensive surveys, 4 surveys
	French River	5 surveys
	Millers River	3 intensive surveys
	South Shore (North River)	7 surveys
	Stony Brook	3 surveys

COASTAL MONITORING

Because of the increasing concern with coastal pollution; a Marine Section of the Technical Services Branch was formed in early 1986. A major activity of this group has been the continued monitoring of the quality of coastal waters. Major areas of concern include such highly polluted regions as Boston Harbor, Salem-Beverly Harbor and New Bedford Harbor, as well as relatively unpolluted areas such as much of Buzzards Bay, Cape Cod and the Islands. The polluted areas are monitored to assess improvement in water quality when water pollution control measures are instituted. Unpolluted areas, on the other hand, must be carefully monitored in order to gain the knowledge necessary for their continued preservation.

A second major activity of the Marine Section has been the special studies conducted in Buzzards Bay as part of the EPA Bays Program. The overall objective of this work is to combine monitoring with detailed investigations into the mechanisms and processes that control the fates and effects of pollutants entering coastal waters. These studies will be useful not only in expanding our understanding of marine pollution and the means to monitor it, but will also provide information for making more meaningful management decisions.

During 1986 and 1987 coastal surveys were conducted in the following areas:

1986
Boston Harbor
Taunton River Estuary
Merrimack River Estuary
Lynn Harbor
Westport River
Paskcamanset and Slocums Rivers
New Bedford Harbor
Outer Buzzards Bay
Martha's Vineyard

1987
Boston Harbor
Hingham Bay and tributaries
Gloucester Harbor
Manchester
Salem-Beverly Harbors
Marblehead
Cohasset
Plymouth Wellfleet
Martha's Vineyard

COMPLIANCE MONITORING

The National Pollutant Discharge Elimination System (NPDES) was established as part of PL 92-500. It requires all dischargers of pollutants to a waterbody to obtain a permit to discharge. A pollution abatement schedule may be established to fulfill the goals of NPDES. Monitoring of these wastewater discharges is required to assure compliance with the terms of the discharge permits and is performed by the permittee. DWPC personnel spot check dischargers to corroborate results. Samples are split with the permit holders when possible to reduce differences in reported values. Monitoring of permit holders is coordinated with the water quality river sampling program to provide data for mathematical models and to be used in determining the level of contaminants (if any) discharged to the receiving water. Approximately 125 discharges are sampled each year. Discharge samples range from three day, 24-hour composites on major municipal facilities to grab samples on some minor industrial discharges.

Twenty-four hour composite samples are taken with an ISCO sampler, sampling approximately 350 ml each hour. The individual bottles are then aliquoted and composited into one time-based sample. Aliquots are either flow based or in equal portions. The parameters for analysis on each sample will depend upon the nature of the discharge and the discharge permit.

Special studies are occasionally conducted on individual wastewater treatment plants. These studies include intensive sampling throughout the process from the influent to the effluent. These analyses help determine treatment effectiveness and capacities.

BIOMONITORING/AQUATIC LIFE ASSESSMENTS

The Biomonitoring Program is an integral component of the state-wide surface water quality monitoring program which is authorized by the 1983 Massachusetts Clean Waters Act, Section 27, paragraph 8. The importance of biological monitoring is underscored in the "Declaration of Goals and Policy" Section 101 (a) of Public Law 92-500 (1972) which stresses the need to restore the biological integrity of the nation's waters and achieve a water quality which provides for the protection and propagation of aquatic life.

The Biomonitoring Program comprises four areas of emphasis: macroinvertebrate rapid bioassessment (MRB), fish tissue monitoring, toxicity assessment (including bioassay), and microbiology (including a phytoplankton/chlorophyll support laboratory). Biomonitoring personnel conduct biological sampling and analyses to supplement other water quality monitoring and management programs, and make recommendations with regard to the control of toxic effluents and thermal discharges through the NPDES permitting process. A Biomonitoring Program Standard Operating Procedures (SOP) manual documents all field and laboratory methods used by Biomonitoring personnel while carrying out the various program elements. This manual is updated periodically. The following discussion provides more detailed information on each biomonitoring element. In addition, a list of biomonitoring surveys undertaken during the years 1986 and 1987 is presented in Table 13.

Macroinvertebrate Rapid Bioassessment (MRB)

This rapid assessment technique involves the use of semi-quantitative sampling methods designed to minimize laboratory time requirements for taxonomic identification and enumeration of aquatic macroinvertebrates. The MRB provides standardized procedures for assessing the impacts of organic and toxic pollutants on aquatic invertebrates; and it provides the basis for making relative comparisons pertaining to water quality conditions between sampling stations and/or to document long-term trends at fixed sites.

An upstream-downstream sampling regime is usually employed whereby known or suspected sources of pollution are bracketed by sampling stations. Impact assessment is carried out by making structural and functional comparisons between upstream reference communities and downstream impacted communities.

For the MRB, the members of a 100-organism subset of a larger sample are identified to genus or species level. The taxonomic data are then compiled to determine the status of various criteria used to rank water quality. These criteria include:

1) Species richness;
2) distribution "balance";
3) EPT value (number of taxa in Ephemeroptera, Plecoptera, Trichoptera);
4) percent contribution, pollution tolerances, and feeding habits of the five numerically dominant species; and
5) Hilsenhoff Biotic Index (HBI).

TABLE 13

MDWPC BIOMONITORING SURVEYS (1986-1987)

Macroinvertebrate Rapid Bioassessments

- Sudbury River (5 sites)
- Ten Mile River (2 sites)
- Millers River (7 sites)
- French River (3 sites)
- Assabet River (2 sites)
- Charles River (1 site)

Fish Toxics Monitoring Studies

- South Meadow Pond (Clinton)
- Ten Mile - Severnmile - Bungay rivers
- Concord - Sudbury Rivers
- Neponset Reservoir (Foxborough)
- Echo Lake (Hopkinton)
- Merrimack River
- Hoosic River
- Blackstone River (Riverdale Impoundment)
- Dimmock Pond (Springfield)
- Bailey's Pond (Amesbury)
- Muddy Pond (North Carver)
- Millers River
- Heard Pond (Wayland)
- Connecticut River
- Dorothy Pond (Millbury)
- Shubael Pond (Barnstable)

Bacteriological Surveys

- Buzzards Bay including:
  - Westport River - Snells Creek
  - Wareham River
- North River

TABLE 14

SUMMARY OF MACROINVERTEBRATE RAPID BIOASSESSMENT RESULTS - NUMBER OF SITES WITHIN EACH IMPACT CATEGORY - 1984 - 1986

RIVER BASIN	YEAR	TOTAL NUMBER SITES ASSESSED	DEGREE OF IMPACT						
			NONE	NONE-SLIGHT	SLIGHT	SLIGHT-MODERATE	MODERATE	MODERATE-SEVERE	SEVERE
Ten Mile	1984a	10	0	0	2	3	5	0	0
	1984b	11	0	0	2	6	3	0	0
	1986	2	0	0	2	0	0	0	0
Blackstone	1985	11	0	0	5	0	2	1	3
Nashua	1985	11	1	0	4	2	3	1	0
Hoosic	1984	4	0	1	3	0	0	0	0
	1985	5	2	0	2	0	1	0	0
Sudbury	1986	5	0	0	4	0	1	0	0
TOTAL		59	3	1	24	11	15	2	3

a June
b September

Based on the above criteria, an overall evaluation of each sampling site is made by characterizing the invertebrate community as follows:

1) Non-impacted
2) Slightly Impacted
3) Moderately Impacted
4) Severely Impacted

Table 14 presents a summary of the sites assessed from 1984 - 1986.

The MRB is conducted at up to 25 sampling sites per year in conjunction with comprehensive water quality surveys. Results are used to supplement traditional physicochemical analyses by demonstrating actual instream impacts of pollutants, as well as assessing ambient water quality and habitat conditions throughout a particular watershed.

Fish Toxics Monitoring:

The Fish Toxics Monitoring Program is a cooperative effort involving the Division of Water Pollution Control, Division of Fisheries and Wildlife, DEQE Office of Research and Standards, DEQE - Lawrence Experiment Station, and the Department of Public Health. In addition, the U.S. Fish and Wildlife Service provides technical assistance and some analytical services for special studies. Fish tissue monitoring is conducted to assess the levels of toxic contaminants in freshwater fish, identify waterbodies where those levels may impact human health, and identify waters where toxic chemicals may impact fish and other aquatic life. Fish surveys generally have been restricted to waterbodies where wastewater discharge data or previous water quality studies have indicated potential toxic problems. Furthermore, sampling has been conducted in areas where heavy industrial development or hazardous waste disposal are present. Because of limited resources, human health concerns have received highest priority in the surveys carried out thus far. Therefore, fish tissue analysis has been restricted to edible fish fillets.

Uniform protocols, designed to assure accuracy and prevent cross contamination of samples, are followed for fish collection, processing and shipping. Fish are taken with electroshocking gear or gill nets. Lengths and weights are measured, and fish are visually examined for tumors, lesions, or other indications of disease. Scale samples or other hard parts (e.g., pectoral spines) are obtained from each sample to determine the approximate age of the fish.

Once at the laboratory, samples may be analyzed for specific toxicants (where a particular source is suspected) or for a broad spectrum of heavy metals, pesticides, or organic chemicals. Laboratory analytical methods include atomic absorption spectroscopy and gas chromatography/mass spectrometry.

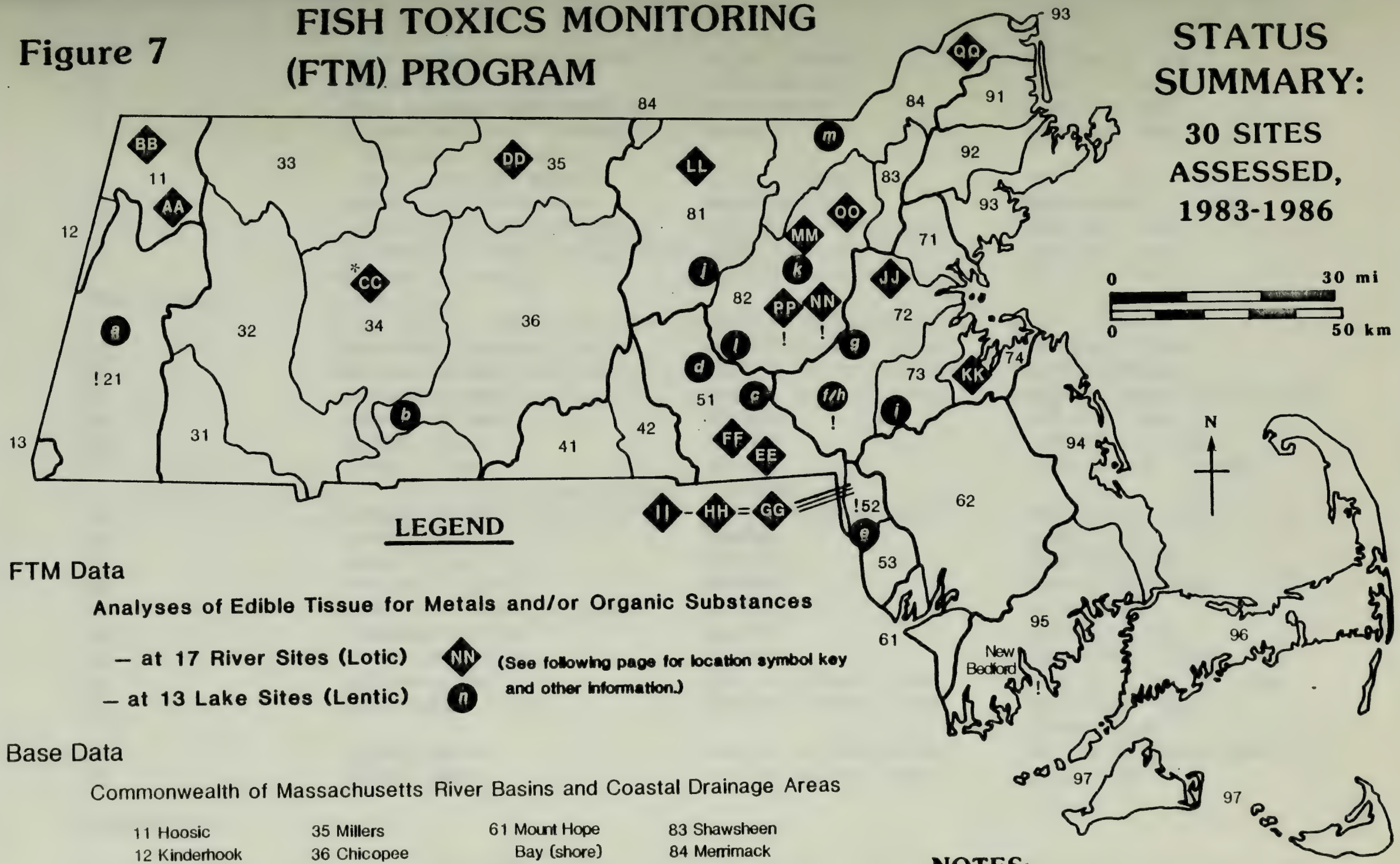
Through 1986, fish samples from approximately thirty (30) sites throughout the Commonwealth of Massachusetts had been analyzed for such heavy metals as cadmium, chromium, copper, mercury, nickel, lead, and zinc; as well as PCB's and PAH's. In addition, analysis for the presence of dioxin (2,3,7,8 TCDD) was conducted in seven ponds and in the vicinity of a confirmed hazardous waste site. A summary of the fish toxics monitoring surveys conducted from 1983 - 1986 is presented in Figure 7.

Figure 7

FISH TOXICS MONITORING (FTM) PROGRAM

STATUS SUMMARY:

30 SITES ASSESSED, 1983-1986



LEGEND

FTM Data

Analyses of Edible Tissue for Metals and/or Organic Substances

- **— at 17 River Sites (Lotic)** ◆ NN
- **— at 13 Lake Sites (Lentic)** ● n

(See following page for location symbol key and other information.)

Base Data

Commonwealth of Massachusetts River Basins and Coastal Drainage Areas

11 Hoosic
12 Kinderhook
13 Bashbish
21 Housatonic
31 Farmington
32 Westfield
33 Deerfield
34 Connecticut
35 Millers
36 Chicopee
41 Quinebaug
42 French
51 Blackstone
52 Ten Mile
53 Narragansett Bay (shore)
61 Mount Hope Bay (shore)
62 Taunton
71 Mystic
72 Charles
73 Neponset
74 Weymouth & Weir
81 Nashua
82 Concord
83 Shawsheen
84 Merrimack
91 Parker
92 Ipswich
93 North Shore
94 South Shore
95 Buzzards Bay
96 Cape Cod
97 Islands

NOTES:

! nn ● ◆ ! ! **INDICATES PUBLIC HEALTH ADVISORY IN EFFECT. (Also, New Bedford Harbor)**

* ◆ **INDICATES ANALYSIS OF WHOLE FISH (U.S. FISH & WILDLIFE SERVICE data).**

TABLE 15

FISH TOXICS MONITORING (FTM) PROGRAM
LOCATION SYMBOL KEY FOR FIGURE 7

SYMBOL	SITE	ANALYSES	DATE(S)
River Sites			
AA	Hoosic River	PCB's; Organic Scan	June, 1985
BB	Hoosic River	Metals[1]; Organic Scan	Jul 15-16, 1986; Sept. 23-24, 1986
CC	Connecticut River	Metals; Organic Scan	Aug 11-14, 1985
DD	Millers River	PCB's; Organic Scan	Sept 26 - Oct. 2, 1985
EE	Blackstone River	Metals	June 18-21, 1985
FF	Blackstone River	Metals	July 30, 1986
GG	Ten Mile/Sevenmile Rivers	Metals	July, 1984
HH	Sevenmile River	Metals	June 11-20, 1986
II	Bungay River	Metals	June 13, 1986
JJ	Charles River	Metals	July, 1985
KK	Cochato River	Metals; PCB's; TCDD (dioxin)	July 25-29, 1985
LL	Nashua River	Metals	June 26-Jul 9, 1985
MM	Assabet River	Metals	July 22-23, 1985
NN	Sudbury River	Metals	Aug 6-8, 1985
OO	Concord River	Metals	July 3, 1986; Jul 24,1986
PP	Sudbury River	Metals	July 8-9, 1986
QQ	Merrimack River	Metals; Organic Scan	Aug 7-21, 1986
Lake Sites:			
a	Stockbridge Bowl (Stockbridge)	TCDD (dioxin)	Sept 13, 1983
b	Dimmock Pond (Springfield)	Metals; Organic Scan	Sept 30, 1986
c	North Pond (Hopkinton)	TCDD (dioxin)	Aug 31-Sept 1, 1983
d	Flint Pond (Shrewsbury-Grafton - Worcester)	TCDD (dioxin)	Sept 7, 1983
e	Turner Reservoir (Seekonk)	Metals	June 15, 1986
f	Lake Winthrop (Holliston)	TCDD (dioxin)	Sept 1-2 1983
g	Nonesuch Pond (Natick)	TCDD (dioxin)	Sept 7, 1983
h	Lake Winthrop (Holliston)	TCDD (dioxin)	May 30-31, 1985

LOCATION SYMBOL KEY (CONTINUED)

SYMBOL	SITE	ANALYSES	DATE(S)
i	Neponset Reservoir (Foxborough)	Metals; Organic Scan	July 29, 1986
j	South Meadow Pond (Clinton)	Metals; Organic Scan	May 8, 1986
k	Boons Pond (Hudson-Stow)	TCDD (dioxin)	Sept 7-8, 1983
l	Hocomonco Pond (Westborough)	Arsenic; chromium; PAH's	Aug 23, 1985
m	Flint Pond (Tyngsborough)	Metals; TCDD (dioxin)	May 24, 1985

Note:

[1] metals: aluminum, cadmium, chromium, copper, iron, mercury, nickel, lead, zinc.

All fish data are submitted to the Office of Research and Standards (ORS) and the Department of Public Health for review. U.S. Food and Drug Administration (FDA) "action levels" are available for only eight pesticides, mercury, and PCB's. In addition, there exists an FDA dioxin advisory criterion for consumption of fish from the Great Lakes. Based on available data, several advisories have been put into effect in Massachusetts. These are presented in Table 16.

Toxicity Testing

The in-house toxicity testing capabilities of the Biomonitoring Program are presently limited to the use of one Microtox™ Toxicity Analyzer. This analyzer uses a lyophilized (freeze-dried) marine bioluminescence bacterium, Photobacterium phosphoreum, which, upon reconstitution, emits a fairly constant level of light. Upon exposure to a toxicant, the level of bioluminescent is diminished in direct proportion to the toxicant concentration. Toxicity testing by other laboratory methods are conducted under a cooperative agreement with the U.S. EPA New England Regional Laboratory in Lexington, MA, and through an R&D Services contract with a private laboratory. These laboratories conduct acute toxicity tests using fathead minnows and cladocerans (Daphnia spp.), and chronic tests using Ceriodaphnia sp. A decision has been made to expand the toxicity testing capabilities of the MDWPC Technical Services Branch to include freshwater static and static renewal acute and chronic toxicity tests using the aforementioned test organisms. A laboratory is currently being established in an office-type trailer that will become functional sometime in 1988. Toxicity data will be used to assess the impacts of point and nonpoint sources of toxic contamination in surface waters throughout Massachusetts and to formulate recommendations for abating toxic pollution through the NPDES permitting process, toxicity reduction evaluations (TRE's), and other water quality management strategies.

Objectives of the Microtox™ toxicity assessment program are:

1) To assess the effectiveness of municipal and industrial wastewater treatment facilities in eliminating aquatic toxicity;

2) to selectively screen water and sediment samples prior to conducting more expensive and time-consuming conventional toxicity tests;

3) to determine the toxicity of known toxicants using laboratory-prepared solutions of known concentrations; and

4) to compare Microtox™ test results with those from other toxicity tests.

Microtox™ results are typically expressed as 30-minute EC_{50} values. The EC_{50} is defined as the sample concentration that causes a fifty percent reduction in light production. The relationship of the EC_{50} to toxicity is an inverse one; i.e., the lower the EC_{50}, the greater the toxicity of the sample.

Each municipal treatment plant and industrial discharge sample has been ranked on the following scale according to the 30-minute EC_{50}:

TABLE 16

FISH CONSUMPTION ADVISORIES IN EFFECT
IN MASSACHUSETTS WATERS

WATER BODY	AGENCY[1]	RESTRICTIONS	SPECIES AFFECTED	POLLUTANTS OF CONCERN
Acushnet River/New Bedford Harbor	DPH, DMF	Closed to fishing in 3 designated areas	Area 1 - all fish Area 2 - lobsters, bottom fish[2] Area 3 - lobsters only	PCB's
Quabbin Reservoir	DPH, MDC	Consumption advisory - high-risk groups	All fish	mercury
Sudbury River/ Heard Pond	DPH,DEQE, DFW	Consumption advisory	All fish	mercury
Ten Mile & Sevenmile Rivers	DPH	Consumption advisory	All fish	lead
Copicut River/ Cornell Pond	DPH	Consumption advisory	American eel only	PCB's
Lake Winthrop (Holliston)	DPH	Consumption advisory	All fish	dioxin
Housatonic River	DFW	Consumption advisory	All fish, frogs, turtles	PCB's
Millers River	DPH	Consumption advisory	American eel; brown trout; other species limit to two meals per month	PCB's; mercury

Notes:
[1] DMF - MA Division of Marine Fisheries
DPH - MA Department of Public Health
DEQE - MA Department of Environmental Quality Engineering
DFW - MA Division of Fisheries and Wildlife
MDC - Metropolitan District Commission
[2] Includes eels, flounders, scup, tautog

EC_{50}	Toxicity Score
<10%	4 Very Toxic
10-50%	3 Toxic
50-80%	2 Moderately Toxic
80-100%	1 Slightly Toxic
>100%	0 Non-Toxic

Since the inception of this testing program in 1985, approximately 135 samples from municipal and industrial wastewater treatment facilities have been analyzed with the Microtox™ toxicity testing system. The following list presents those municipal wastewater treatment facilities (and river basins) from which prechlorinated effluent samples exhibited some toxicity (i.e., $EC_{50} \leq 100\%$):

Adams (Hoosic)	Erving (Millers)	North Attleborough (Ten Mile)
Athol (Millers)	Gardner (Millers)	Oxford-Rochdale (French)
Attleboro (Ten Mile)	Holyoke (Connecticut)	Swampscott (North Shore)
Ayer (Nashua)	Leicester (French)	Templeton (Millers)
Chicopee (Chicopee)	Lowell (Merrimack)	Webster (French)
Clinton (Nashua)	Marlborough West (Assabet)	Westborough (Assabet)

Those municipal facilities at which no toxicity was detected (i.e., $EC_{50} > 100\%$) in any unchlorinated effluent samples are listed below:

Charles River WPCD	Millers Falls
Farley	Orange
Greater Lawrence Sanitary District	South Royalston
Hoosic Valley	Springfield
Maynard	Upper Blackstone WPAD
Medfield	Ware
Milford	Winchendon

Twenty-four industrial facilities for which effluent Microtox™ toxicity data are available are ranked according to toxicity in Table 17. Note that fourteen, or 58%, of the facilities tested exhibited some toxicity in the effluent.

Finally, water samples from a total of fifteen (15) instream sites, distributed among five river basins, have been analyzed with the Microtox™ system. Those basins are the Blackstone, Charles, Merrimack, Millers and Concord. Each had instream stations which exhibited incipient toxicity at EC_{20} levels. The Charles and Millers watersheds also had instream sites which yielded EC_{50}'s. Unlike wastewater discharges, instream sites are not ranked according to EC_{50}'s alone. Rather, EC_{20} values are also of concern as they are indicative of low levels of ambient toxicity that remain instream after dilution of upstream sources of toxicity.

Microbiology Program

Microbiological monitoring includes both the maintenance of a small support laboratory for algal identifications and chlorophyll determinations, and the assessment of bacterial indicators of water pollution. The algal counts and chlorophyll results are used by personnel in the Lakes Section in a scoring system for determining the trophic status of lakes and ponds. Data from

TABLE 17

RELATIVE TOXICITIES OF INDUSTRIAL EFFLUENTS BASED ON MICROTOX™ RESULTS

FACILITY	MUNICIPALITY	RIVER BASIN
Very Toxic (EC_{50}<10%)		
Reliable Electroplating Co.	Norton	Taunton
Shell Oil Company	Boylston	Nashua
W.R. Grace Co.	Nashua, NH	Merrimack
Toxic (10%<EC_{50}<50%)		
Foxboro Company	East Bridgewater	Taunton
New England Plating Co..	Worcester	Blackstone
Silicon Transistor Co.	Chelmsford	Concord
Spencer Press	Hingham	Weymouth/Weir
Whitman Plating Co.	Whitman	Taunton
Worcester Tool & Stamping Co.	Leicester	French
Moderately Toxic (50% ≤ EC_{50}<80%)		
AT&T	North Andover	Merrimack
Foxboro Company	Foxborough	Neponset
L.S. Starrett	Athol	Millers
Seaman Paper Co.	Templeton	Millers
Taunton Silver	Taunton	Taunton
Non-Toxic (EC_{50}>100%)		
American Optical	Southbridge	Quinebaug
Advanced Coatings	Westminster	Nashua
Brookfield Wire Co.	Brookfield	Chicopee
Kelly Company	Clinton	Nashua
New England Apple Products	Littleton	Stony Brook
Pfizer Co.	Adams	Hoosic
Polysar	Leominster	Nashua
Simplex Time Recorder	Gardner	Millers
Westford Anodizing	Westford	Merrimack
Zero Corporation	Monson	Chicopee

riverine and coastal waters are used to identify waterbodies exhibiting improved or deteriorated water quality conditions over time. Algal indicators of the presence of elevated metals levels, nutrient enrichment, or other contaminants (e.g., oil and grease) are cited in the interpretive information provided to the water quality analysts. Approximately 300 chlorophyll analyses and 250 algal identifications and counts are conducted annually.

In the past two years, several bacteriological indicators including, but not limited to, the source differentiation of the fecal streptococci bacteria were used to assess water quality conditions and determine sources of fecal contamination in the North River, Westport River, and Wareham River coastal drainage areas. Source differentiation of the fecal streptococci bacteria provides a means for determining the source of elevated bacteria counts. The kinds of sources that can be distinguished by this method are: insects, birds, warm-blooded animals, and decaying vegetation. Identification of the type of source will aid in the establishment of mitigative measures for controlling nonpoint sources of fecal contamination.

SPECIAL CONCERNS

Water quality in the state of Massachusetts has been improving, yet many rivers, lakes, harbors and groundwater supplies continue to remain in violation of standards. Continued degradation is caused by many different sources. The Department is addressing these special concerns by developing new programs, studying situations and causes, and modifying existing programs and regulations. The major drawback to implementing these programs is limited funding. Special concerns are listed below..

1) Widespread Contamination of Water Supply Systems

The number of public water supply systems being closed due to contamination is increasing. In Massachusetts 41 of the 275 municipalities relying on groundwater have had to close wells. Treatment methods for existing contaminated supplies are being studied and protection for new or existing water supplies is being initiated. Several towns are buying land surrounding the wells or reservoirs and establishing buffer zones near recharging aquifers. Funding is the major limitation to the complete success of these programs.

2) Proper Containment of Hazardous Waste Sites

The past practices of hazardous waste disposal is causing toxic conditions in the surface and groundwaters of the Commonwealth. The recent passing of two acts, Chapter 21C and Chapter 21E mandate the identification, clean-up and containment of hazardous waste sites and provide regulations for the proper handling and disposal of hazardous wastes.

3) Coastal Water Quality Degradation

The coastal and marine waters of the Commonwealth have only recently been studied. Major pollutant problems and health hazards have been documented, causing numerous shellfish closings and fish consumption advisories. Wastewater treatment plants with ocean discharges are being studied, modeled, and assessed. A new coastal monitoring section has been developed within the Department to sample, analyze and assess the coastal water quality degradation. Initial recommendations include upgrading ocean discharges and eliminating combined sewer overflows.

4) Prevention and Control of Nonpoint Sources

Water quality problems due to point sources of pollution have been improved due to the construction and upgrading of wastewater treatment plants. Nonpoint source pollution is rapidly becoming the leading cause of degradation in rivers, lakes and harbors. A new Nonpoint Source Pollution Control Program is being established to assess the problem and make recommendations to control nonpoint source pollution. Funding will be necessary to carry out any control actions.

5) Eutrophication of Lakes and Ponds

The Clean Lakes Program in the Department conducts baseline surveys and intensive surveys to classify the lakes and ponds and develop a restoration and preservation program. To date, 56 of the 478 lakes and ponds studied are eutrophic. By controlling shoreline development, constructing outlet structures and implementing clean up and management plans, lake eutrophication can be reduced or prevented.

6) Acidification of Lakes and Ponds Throughout the Commonwealth

The impact from acid rain on the lakes and ponds in the Commonwealth has only recently been studied. Approximately 200 surveyed Massachusetts lakes either have been impacted by or are susceptible to acidic inputs. Acidic conditions are threatening to impact the biological communities and immobilize toxics in the sediments. Limited programs exist to correct this problem. There is only one program which uses state funds to address the acid rain impact. In two years this program has limed only nine ponds. More programs, increased funding and more manpower are needed to correct this problem.

7) Proper Operation of Water and Wastewater Treatment Plants

With the construction and upgrading of wastewater treatment plants it is imperative that the facilities are properly maintained and operated to realize their full benefit. The Technical Assistance and Training Section of the Department provides numerous training courses, seminars and the development of recognition award programs and evaluation programs.

8) Toxicity Evaluation

The construction and upgrading of treatment plants has removed most of the conventional pollutants from the Commonwealths waters. Instream toxic problems are becoming the leading pollutant problem. A new Microtox™ toxicity testing program as well as the sampling of edible fish fillets and macroinvertebrates is used to determine the water quality status and problems. The data are used to evaluate healthy environments or determine if hazardous or toxic substances are present. Fish tissue monitoring determines if toxics are present at concentrations that may be harmful to human consumption. The programs need to be expanded.

9) Elimination of Combined Sewer Overflows

Several major rivers receive raw sewage discharges from combined sewer overflows (CSO's). These CSO's contribute high bacteria concentrations, nutrient loads, solids and high oxygen demands to the water quality, causing partial or non-support of designated uses. Extensive studies, sewer rehabilitation and construction is needed to eliminate the CSO's. The lack of funding is a major drawback to the progress of CSO elimination.

MASS. EA22.2: C73/988/app. 1

COMMONWEALTH OF MASSACHUSETTS SUMMARY OF WATER QUALITY 1988

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Appendix I – Massachusetts Surface Water Quality Standards

Massachusetts Department of Environmental Quality Engineering
Kenneth Hagg, Acting Commissioner

DIVISION of WATER POLLUTION CONTROL

Thomas C. McMahon, Director

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APPENDIX I

Commonwealth of Massachusetts

Water Resources Commission

Division of Water Pollution Control

MASSACHUSETTS SURFACE WATER QUALITY STANDARDS

4.01: GENERAL PROVISIONS

(1) Title. These regulations shall be known as the "Massachusetts Surface Water Quality Standards."

(2) Organization of Standards. These standards comprise five units: General Provisions (314 CMR 4.01), Application of Standards (314 CMR 4.02), Water Quality Criteria (314 CMR 4.03), Antidegradation Provisions (314 CMR 4.04), and Basin Classification and Maps (314 CMR 4.05).

(3) Authority. The Massachusetts Surface Water Quality Standards are adopted by the Division pursuant to the provisions of M.G.L. c.21, §27.

(4) Purpose. The Massachusetts Act charges the Division with the duty and responsibility to enhance the quality and value of the water resources of the Commonwealth and directs the Division to take all action necessary or appropriate to secure to the Commonwealth the benefits of the Federal Act. The objective of the Federal Act is the restoration and maintenance of the chemical, physical and biological integrity of the Nation's waters. To achieve the foregoing requirements the Division has adopted these standards which designate the uses for which the various waters of the Commonwealth shall be enhanced, maintained and protected; which prescribe the water quality criteria required to sustain the designated uses; and which contain regulations necessary to achieve the designated uses and maintain existing water quality including, where appropriate, the prohibition of discharges.

(5) Definitions. As used in these standards, the following words have the following meanings:

Artificial conditions - Those conditions resulting from human alteration of the chemical, physical or biological integrity of waters.

Beneficial use - Any use not impairing the most sensitive use designated in the classification tables contained in 314 CMR 4.05; except that in no case shall the assimilation or transport of pollutants be deemed a beneficial use.

Cold water fishery - Waters whose quality is capable of sustaining a year-round population of cold water trout (salmonidae).

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Division - The Massachusetts Division of Water Pollution Control, as established by General Laws c.21, §26.

Discharge - Any addition of any pollutant to the waters of the Commonwealth.

EPA - The United States Environmental Protection Agency.

Federal Act - The Federal Water Pollution Control Act, as amended, 33 U.S.C. §§1251, et seq.

Massachusetts Act - The Massachusetts Clean Waters Act, as amended, General Laws, c.21, §§26-53, inclusive.

Pollutant - Any element or property of sewage, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter, in whatever form and whether originating at a point or major nonpoint source, which is or may be discharged, drained or otherwise introduced into any sewerage system, treatment works or waters of the Commonwealth.

Primary contact recreation - Any recreation or other water use, such as swimming and water skiing, in which there is prolonged and intimate contact with the water sufficient to constitute a health hazard.

Seasonal cold water fishery - Waters whose quality is capable of sustaining only an extremely limited cold water population on a year-round basis, with cold water fish in these streams provided largely by stocking.

Secondary contact recreation - Any recreation or other water use in which contact with the water is either incidental or accidental, such as fishing, boating and limited contact incident to shoreline activities.

Segment - A finite portion of a water body established by the Division for the purpose of classification.

Surface Waters - All waters other than ground waters within the jurisdiction of the Commonwealth, including without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands and coastal waters.

Warm water fishery - Waters whose quality is not capable of sustaining a year-round cold water or seasonal cold water fishery.

Waters of the Commonwealth - All waters within the jurisdiction of the Commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, coastal waters, and ground waters.

(6) Severability. If any provision of these standards is held invalid, the remainder of these standards shall not be affected thereby.

4.02: APPLICATION OF STANDARDS

(1) Establishment of Effluent Limitations. In regulating discharges of pollutants to surface waters, the Division will limit or prohibit such

discharges to insure that the water quality standards of the receiving waters will be maintained or attained. The determination by the Division of the applicable level of treatment for an individual discharger will be made in the establishment of effluent limitations in the individual discharge permits in accordance with 314 CMR 3.10(3), (4), (5) and (6). In establishing water quality based effluent limitations, the Division must consider natural background conditions, existing discharges, must protect existing downstream uses, and must not interfere with the maintenance and attainment of beneficial uses in downstream waters. Toward this end, the Division may provide a reasonable margin of safety to account for any lack of knowledge concerning the relationship between the pollutants being discharged and their impact on the quality of the receiving waters.

(2) Mixing Zones. In applying these standards, the Division may recognize, where appropriate, a limited mixing zone or zone of initial dilution on a case-by-case basis. The location, size and shape of these zones shall provide for the maximum protection of aquatic resources. At a minimum, mixing zones must:

a) Meet the criteria for aesthetics;

b) Be limited to an area or volume that will minimize interference with the designated uses or established community of aquatic life in the segment;

c) Allow an appropriate zone of passage for migrating fish and other organisms; and

d) Not result in substances accumulating in sediments, aquatic life or food chains to exceed known or predicted safe exposure levels for the health of humans or aquatic life.

(3) Hydrologic Conditions. The Division will determine the most severe hydrologic condition at which water quality standards must be met. In classifying the inland surface waters and in applying these standards to such waters, the critical low flow condition at and above which these standards must be met is the average minimum consecutive seven-day flow to be expected once in ten years, unless otherwise stated by the Division in these standards. In artificially regulated waters, the critical low flow will be established by the Division through agreement with the Federal, state or private interest controlling the flow. The minimum flow established in such agreement will become the critical low flow under this section for those waters covered by the agreement.

(4) Procedures for Sampling and Analysis. For the purpose of collecting, preserving and analyzing samples in connection with these water quality standards, the fifteenth edition of Standard Methods of the Examination of Water and Wastewater published by the American Public Health Association, or Methods for Chemical Analysis of Water and Wastes published by the U.S. Environmental Protection Agency should be used. Where a method is not given in these publications, the latest procedures of the American Society for Testing Materials (ASTM) shall be used, or any other equivalent method approved by the Director.

4.03: MINIMUM WATER QUALITY CRITERIA AND ASSOCIATED USES

(1) Description of Contents. 314 CMR 4.03 sets forth the Classes to be used by the Division in classifying the surface waters according to the uses for which the waters shall be enhanced, maintained and protected. For each class, the most sensitive beneficial uses are identified and minimum criteria for water quality in the water column are established. In interpreting and applying the minimum criteria in 314 CMR 4.03(4), the Division shall consider local conditions including, but not limited to:

a) the characteristics of the biological community;

b) temperature, weather, flow, and physical and chemical characteristics; and

c) synergistic and antagonistic effects of combinations of pollutants.

(2) Coordination with Federal Criteria. The Division will use EPA criteria established puruant to Section 304(a)(1) of the Federal Act as guidance in establishing case-by-case discharge limits for pollutants not specifically listed in these standards but included under the heading "Other Constituents" in 314 CMR 4.03(4), for identifying bioassay application factors and for interpretations of narrative criteria. Where the minimum criteria specifically listed by the Division in this part differ from those contained in the federal criteria, the provisions of the specifically listed criteria in these standards shall apply.

(3) Classes and Designated Uses. The surface waters will be assigned to one of the classes listed below. Each class is defined by the most sensitive, and therefore governing, uses which it is intended to protect. The classes are:

Classes for Inland Waters

Class A - Waters assigned to this class are designated for use as a source of public water supply.

Class B - Waters assigned to this class are designated for the uses of protection and propagation of fish, other aquatic life and wildlife; and for primary and secondary contact recreation.

Class C - Waters assigned to this class are designated for the uses of protection and propagation of fish, other aquatic life and wildlife; and for secondary contact recreation.

Classes for Coastal and Marine Waters

Class SA - Waters assigned to this class are designated for the uses of protection and propagation of fish, other aquatic life and wildlife; for primary and secondary contact recreation; and for shellfish harvesting without depuration in approved areas.

Class SB - Waters assigned to this class are designated for the uses of protection and propagation of fish, other aquatic life and wildlife; for primary and secondary contact recreation; and for shellfish harvesting with depuration (Restricted Shellfish Areas).

Class SC - Waters assigned to this class are designated for the protection and propagation of fish, other aquatic life and wildlife; and for secondary contact recreation.

(4) Minimum Criteria. The following minimum criteria are adopted and shall be applicable to all surface waters.

A. These minimum criteria are applicable to all waters of the Commonwealth, unless criteria specified for individual classes are more stringent.

	Parameter	Criteria
1.	Aesthetics	All waters shall be free from pollutants in concentrations or combinations that: a) Settle to form objectionable deposits; b) Float as debris, scum or other matter to form nuisances; c) Produce objectionable odor, color, taste or turbidity; or, d) Result in the dominance of nuisance species.
2.	Radioactive Substances	Shall not exceed the recommended limits of the United States Environmental Protection Agency's National Drinking Water Regulations.
3.	Tainting Substances	Shall not be in concentrations or combinations that produce undesirable flavors in the edible portions of aquatic organisms.
4.	Color, Turbidity, Total Suspended Solids	Shall not be in concentrations or combinations that would exceed the recommended limits on the most sensitive receiving water use.
5.	Oil and Grease	The water surface shall be free from floating oils, grease and petrochemicals and any concentrations or combinations in the water column or sediments that are aesthetically objectionable or deleterious to the biota are prohibited. For oil and grease of petroleum origin the maximum allowable discharge concentration is 15 mg/l.
6.	Nutrients	Shall not exceed the site-specific limits necessary to control accelerated or cultural eutrophication.
7.	Other Constituents	Waters shall be free from pollutants in concentrations or combinations that:

a) Exceed the recommended limits on the most sensitive receiving water use;
b) Injure, are toxic to, or produce adverse physiological or behavioral responses in humans or aquatic life; or,
c) Exceed site-specific safe exposure levels determined by bioassay using sensitive species.

B. Inland Waters - the following additional minimum criteria are applicable to inland water classifications.

For Class A waters:

	Parameter	Criteria
1.	Dissolved Oxygen	Shall be a minimum of 5.0 mg/l in warm water fisheries and a minimum of 6.0 mg/l in cold water fisheries.
2.	Temperature	Shall not exceed 83°F (28.3°C) in warm water fisheries or 68°F (20°C) in cold water fisheries nor shall the rise resulting from artificial origin exceed 4.0°F (2.2°C).
3.	pH	As naturally occurs.
4.	Total Coliform Bacteria	Shall not exceed a log mean for a set of samples of 50 per 100 ml during any monthly sampling period.
5.	Turbidity	None other than of natural origin.
6.	Total Dissolved Solids	Shall not exceed 500 mg/l.
7.	Chlorides	Shall not exceed 250 mg/l.
8.	Sulfates	Shall not exceed 250 mg/l.
9.	Nitrate	Shall not exceed 10 mg/l as nitrogen.

For Class B waters:

	Parameter	Criteria
1.	Dissolved Oxygen	Shall be a minimum of 5.0 mg/l in warm water fisheries and a minimum of 6.0 mg/l in cold water fisheries.
2.	Temperature	Shall not exceed 83°F (28.3°C) in warm water fisheries or 68°F (20°C) in cold water

		fisheries, nor shall the rise resulting from artificial origin exceed 4.0°F (2.2°C).
3.	pH	Shall be in the range of 6.5-8.0 standard units and not more than 0.2 units outside of the naturally occurring range.
4.	Fecal Coliform Bacteria	Shall not exceed a log mean for a set of samples of 200 per 100 ml, nor shall more than 10% of the total samples exceed 400 per 100 ml during any monthly sampling period, except as provided in 310 CMR 4.02(1).

For Class C waters:

	Parameter	Criteria
1.	Dissolved Oxygen	Shall be a minimum of 5.0 mg/l in warm water fisheries and a minimum of 6.0 mg/l in cold water fisheries.
2.	Temperature	Shall not exceed 83°F (28.3°C) in warm water fisheries or 68°F (20°C) in cold water fisheries, nor shall the rise resulting from artificial origin exceed 4.0°F (2.2°C).
3.	pH	Shall be in the range of 6.5-9.0 standard units and not more than 0.2 units outside of the naturally occurring range.
4.	Fecal Coliform Bacteria	Shall not exceed a log mean for a set of samples of 1000 per 100 ml, nor shall more than 10% of the total samples exceed 2500 per 100 ml during any monthly sampling period, except as provided in 310 CMR 4.02(1).

C. Coastal and Marine Waters - the following additional minimum criteria are applicable to coastal and marine waters.

For Class SA waters:

	Parameter	Criteria
1.	Dissolved Oxygen	Shall be a minimum of 85 percent of saturation at water temperatures above 77°F (25°C) and shall be a minimum of 6.0 mg/l at water temperatures of 77°F (25°C) and below.
2.	Temperature Increase	None except where the increase will not exceed the recommended limits on the most sensitive water use.

3.	pH	Shall be in the range of 6.5-8.5 standard units and not more than 0.2 units outside of the naturally occurring range.
4.	Total Coliform Bacteria	Shall not exceed a median value of 70 MPN per 100 ml and not more than 10% of the samples shall exceed 230 MPN per 100 ml in any monthly sampling period.

For Class SB waters:

	Parameter	Criteria
1.	Dissolved Oxygen	Shall be a minimum of 85 percent of saturation at water temperatures above 77°F (25°C) and shall be minimum of 6.0 mg/l at water temperatures of 77°F (25°C) and below.
2.	Temperature Increase	None except where the increase will not exceed the recommended limits on the most sensitive water use.
3.	pH	Shall be in the range of 6.5-8.5 and not more than 0.2 units outside of the naturally occurring range.
4.	Total Coliform Bacteria	Shall not exceed a median value of 700 MPN per 100 ml and not more than 20% of the samples shall exceed 1000 MPN per 100 ml during any monthly sampling period, except as provided in 310 CMR 4.02(1).

For Class SC waters:

	Parameter	Criteria
1.	Dissolved Oxygen	Shall be a minimum of 85 percent of saturation at water temperatures above 77°F (25°C) and shall be a minimum of 6.0 mg/l at water temperatures of 77°F (25°C) and below.
2.	Temperature Increase	None except where the increase will not exceed the recommended limits on the most sensitive water use.
3.	pH	Shall be in the range of 6.5-8.5 standard units and not more than 0.2 units outside the naturally occurring range.
4.	Fecal Coliform Bacteria	Shall not exceed a log mean for a set of samples of 1000 MPN per 100 ml, nor shall more than 10% of the total samples exceed 2500 MPN per 100 ml during any monthly

sampling period, except as provided in 310 CMR 4.02(1).

4.04: ANTIDEGRADATION PROVISIONS

(1) Protection of Existing Uses. In all cases, from and after the date these regulations become effective, the quality of the surface waters shall be maintained and protected to sustain existing beneficial uses.

(2) Protection of High Quality Waters. From and after the date these regulations become effective, waters designated by the Division in 310 CMR 4.05(5) whose quality is or becomes consistantly higher than that quality necessary to sustain the national goal uses shall be maintained at that higher level of quality unless limited degradation is authorized by the Division. Limited degradation may be allowed by the Division as a variance from this regulation as provided in 310 CMR 4.04(6).

(3) Protection of Low Flow Waters. Certain waters will be designated by the Division in Regulation 5.5 of these standards for protection under this section due to their inability to accept pollutant discharges. New or increased discharges of pollutants to waters so designated are prohibited unless a variance is granted by the Division as provided in 314 CMR 4.04(6).

(4) National Resource Waters. Waters which constitute an outstanding national resource as determined by their outstanding recreational, ecological and/or aesthetic values shall be preserved. These waters shall be designated for preservation by the Division in 310 CMR 5.05(5) of these standards. Waters so designated may not be degraded and are not subject to a variance procedure. New discharges of pollutants to such waters are prohibited. Existing discharges shall be eliminated unless the discharger is able to demonstrate that:

a) Alternative means of disposal are not reasonably available or feasible; and,

b) The discharge will not affect the quality of the water as a national resource.

(5) Control of Eutrophication. The discharge of nutrients, primarily phosphorus or nitrogen, to surface waters will be limited or prohibited by the Division as necessary to prevent excessive eutrophication of such waters. There shall be no new or increased discharges of nutrients into lakes and ponds, or tributaries thereto. Existing discharges containing nutrients which encourage eutrophication or growth of weeds or algae shall be treated. Activities which may result in nonpoint discharges of nutrients shall be conducted in accordance with the best management practices reasonably determined by the Division to be necessary to preclude or minimize such discharges of nutrients.

(6) Variances. A variance to authorize a discharge in water designated for protection under 310 CMR 4.04(2) may be allowed by the Division where the applicant demonstrates that:

(a) The proposed degradation will not result in water quality less than specified for the class; and

(b) The adverse economic and social impacts specifically resulting from imposition of controls more stringent than secondary treatment to maintain the higher water quality are substantial and widespread in comparison to other economic factors and are not warranted by a comparison of the economic, social and other benefits to the public resulting from maintenance of the higher quality water. In making such evaluation, the Division will apply, where appropriate, guidance documents published by EPA.

In addition to the above, the applicant for a variance to authorize a discharge into waters designated for protection under 310 CMR 4.04(3) must demonstrate that:

(c) Alternative means of disposal are not reasonably available or feasible.

In any proceeding where such variance is at issue, the Division shall circulate a public notice in accordance with the procedures set forth in M.G.L. c.30A, §3. Said notice shall state that a variance is under consideration by the Division, and indicate the Director's tentative determination relative thereto. To the extent feasible, the variance proceeding shall be conducted as part of any pending discharge permit proceedings pur suant to M.G.L. c.21, §43. In any variance procedure, the burden of proof relative to justifying the variance shall be on the part requesting the variance. Any variance granted pursuant to this regulation shall not extend beyond the expiration date of the permit.

4.05: BASIN CLASSIFICATIONS AND MAPS

(1) Description of Contents. This part sets forth the procedures and guidelines the Division must follow in classifying the waters of the Commonwealth, and the classifications themselves. The procedural rules for classifying are contained in 314 CMR 4.05(2) through 4.05(4). 314 CMR 405(5) contains maps and tabulations identifying the assignment by the Division of each segment to one of the classes set forth in 314 CMR 4.03 of these Standards, the designation of uses and associated criteria for that segment and the imposition of special limitations in 314 CMR 4.04(2) through 4.04(4) to that segment.

(2) Designation of Uses. In determining the appropriate classification for a particular water, the Division must fulfill its statutory mandate as set forth in 314 CMR 4.01(4) of these standards. Wherever attainable, the Division shall designate the national goal uses of protection and propagation of fish, shellfish, aquatic life and wildlife and recreation in and on the waters in classifying the surface waters. In determining whether the national goal uses are attainable for a given water, the Division has considered limitations imposed by natural conditions, irreversible artificial conditions and the availability feasible technological treatment methods and designated the optimum number beneficial uses attainable in the circumstances.

(3) Other Applicable Standards. Waters classified by the Division in 314 CMR 4.05 may be subject to additional restrictions pursuant to federal or Massachusetts statutes and regulations. Where such additional restrictions are known they are noted in the classifications in 314 CMR 4.05. Where these re-

strictions impose requirements more stringent than required under the Massachusetts or Federal Acts, e.g., public health restrictions relative to water supplies, such restrictions shall be considered and applied by the Division in classifying the waters to the extent authorized in the Massachusetts Act.

(4) Fisheries Designations. For inland waters certain specific criteria become applicable on the basis of their designation as a particular type of fishery. Therefore, inland segments are designated as cold water fisheries, seasonal cold water fisheries, warm water fisheries, or for aquatic life. In seasonal cold water fisheries the criteria for cold water fisheries apply during the period of September 15 through June 30 annually, and criteria for warm water fisheries apply at other times.

Where the Division determines that natural or irreversible conditions prevent the attainment of water quality capable of supporting a warm water fishery, a use designation of aquatic life has been made. In each segment so designated in 314 CMR 4.05(5), the criteria for a warm water fishery apply for constituents except those affected by the natural or irreversible condition, which constituents shall be governed by the most sensitive resident species as determined by the Director in consultation with the Massachusetts Division of Fisheries and Wildlife.

(5) Classifications. For the purpose of applying the Massachusetts Surface Water Quality Standards, the surface waters are classified according to water quality and river use.

MASS. EA22.2:C73/988/app. 2

COMMONWEALTH OF MASSACHUSETTS SUMMARY OF WATER QUALITY 1988

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Appendix II – Massachusetts Lake Classification Program

Massachusetts Department of Environmental Quality Engineering
Kenneth Hagg, Acting Commissioner

DIVISION of WATER POLLUTION CONTROL

Thomas C. McMahon, Director

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Approved by Ric Murphy, State Purchasing Agent

LISTING OF CLASSIFIED LAKES AND PONDS

APPENDIX II

MASSACHUSETTS LAKE CLASSIFICATION PROGRAM

In accordance with Public Law 95-217, Section 314 (the "Clean Lakes" section of the 1977 Amendments to the Federal Water Pollution Control Act), the Massachusetts Division of Water Pollution Control developed a lake classification program based upon the trophic condition of all publicly owned freshwater lakes and ponds in the Commonwealth.

The Massachusetts Clean Lakes and Great Ponds Program was created under Chapter 628 of the Acts of 1981. An integral part of that program is the prioritization of publicly owned lakes and ponds for the purpose of providing financial assistance to municipalities for diagnostic-feasibility studies and implementation projects. The prioritization process is composed of several elements, one of which is the trophic status of lakes and ponds. The Division utilizes the Lake Classification Program as the basis for awarding priority points in the trophic status category.

A lake or pond is classified according to the system described in this report. The first step in this process is a baseline limnological survey of the lake or pond. This survey is generally conducted in one day and consists of bathymetric mapping of the lake; physical, chemical and biological sampling of the open water areas, tributary stream(s), and outlet; and a quantitative and qualitative mapping of the aquatic macrophyton community in the lake. The primary purpose of this survey is to classify the lake by its trophic status and identify any point and nonpoint sources of pollution. To date the Divisin has conducted 523 baseline surveys on waterbodies throughout the state.

LAKE CLASSIFICATION SYSTEM

The Division of Water Pollution Control has developed a lake classification system as an aid to setting priorities for the Massachusetts Clean Lakes and Great Ponds Program (Chapter 628 of the Acts of 1981) in Massachusetts. This system is generally applied only to those lakes and ponds for which the Division has collected water quality data. Although a host of physical, chemical, and biological parameters are measured during the normal lake survey, only six critical parameters are employed in the lake classification priority system. The six parameters are hypolimnetic dissolved oxygen, secchi disc reading, phytoplankton count, total ammonia and nitrate-nitrogen, total phosphorus, and aquatic macrophyton. The most recent survey data are used and the priority listing is updated annually. The optimum season for collecting lake data is mid to late summer, or during peak biological production. Unfortunately, this cannot always be achieved, thus spring or autumnal data have to be used in the lake classification system.

The limits used for awarding severity points for the six parameters have been based on several considerations and information sources. These include lake classifications of other states, the natural range of parameters in Massachusetts, limnological texts, and accepted indices of

eutrophication reported in the literature. The severity point system has been formulated as follows:

PARAMETER	CONCENTRATION OR DEGREE OF SEVERITY	POINTS
Hypolimnetic dissolved oxygen	≥5.0 mg/l	0
	<5.0-3.0 mg/l	1
	<3.0-1.0 mg/l	2
	<1.0 mg/l	3
Transparency (secchi disc reading)*	≥15 feet (4.5 meters)	0
	<15-10 feet (4.5-3.0 meters)	1
	<10-4 feet (3.0-1.2 meters)	2
	<4 feet (1.2 meters)	3
Phytoplankton	0-500 cells/ml	0
	<500-1000 cells/ml	1
	<1000-1500 cells/ml	2
	<1500 cells/ml or summer "blooms"	3
Epilimnetic NH_3 + NO_3-N	0-<0.15 mg/l	0
	≥0.15-0.3 mg/l	1
	>0.3-0.5 mg/l	2
	>0.5 mg/l	3
Epilimnetic total phosphorus	0-0.01 mg/l	0
	>0.01-0.05 mg/l	1
	>0.05-0.10 mg/l	2
	>0.10 mg/l	3
Aquatic Vegetation	Sparse	0
	Medium	1
	Dense	2
	Very Dense	3

It is expected that chlorophyll a data will soon augment or replace the phytoplankton data as they become part of the routine lake survey. The severity points may be interpreted as follows:

0 = No problem - considered to be representative of clean water quality.

1 = Slight problem - borderline case considered to be potentially degrading.

2 = Definite problem - considered unacceptable for lake water quality.

3 = Severe problem - undoubtedly causing degradation of the lake's water quality or some recreational uses.

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* Four feet is the minimum allowable transparency at bathing beaches, as stated in Article VII of the State Sanitary Code.

CLASSIFIED LAKES AND PONDS

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Aldrich Lake	66	Granby	Connecticut	S	12	1981	421655/723300
Althea Lake	38	Tyngsborough	Merrimack	S	11	1979	424007/712252
Ames Pond	82	Tewksbury	Shawsheen	U	7	1974	423820/711335
Ames Long Pond†	65	Stoughton	Taunton	U	14	1987	420500/710702
Arcadia Lake†	40	Belchertown	Connecticut	U	6	1978	421818/722540
Lake Archer	79	Wrentham	Charles	S	9	1978	420411/712017
Ashfield Pond†	39	Ashfield	Deerfield	S	7	1986	423154/724803
Ashland Reservoir	155	Ashland	Concord	S	5	1981	421422/712750
Ashmere Lake	217	Hinsdale/Peru	Housatonic	U	5	1983	422045/730500
Ashumet Pond†	203	Mashpee	Cape Cod	S	7	1980	413800/703200
Lake Attitash	335	Amesbury/Merrimac	Merrimack	S	8	1985	425030/705805
Attleboro Gravel Pit #1	--	Attleboro	Ten Mile	U	4	1981	415750/711846
Attleboro Gravel Pit #2	--	Attleboro	Ten Mile	U	3	1981	415450/711852
Augmentation Pond	333	Westborough	Concord	S	14	1979	--
Babson Farm Quarry	--	Rockport	North Shore	S	10	1981	424123/703755
Baddacook Pond	76	Groton	Nashua	S	7	1977	123708/713152
Baker Pond	28	Orleans	Cape Cod	S	5	1980	414600/700015
Baldpate Pond	55	Boxford	Parker	S	10	1981	424152/710010
Bare Hill Pond†	316	Harvard	Nashua	U	11	1983	422930/713545

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* = Salt water
** = Insufficient data
*** = Sampled after dam breached. Under normal conditions, severity points may drop.
-- = No data available
S = Stratified
U = Unstratified
D/F = Diagnostic/Feasibility Study
† = Impaired or threatened

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Barrett Pond	8.3	Leominster	Nashua	S	9	1984	--
Barrowsville Pond	38	Norton	Taunton	U	13	1983	415705/711210
Bartholomew Pond	8	Peabody	North Shore	S	6	1983	423030/705800
Bartlett Pond†	45	Northborough	Concord	U	7	1982	421905/713707
Bartlett Pond†	32	Plymouth	South Shore	U	7	1986	415535/703330
Bearse Pond†	65	Barnstable	Cape Cod	U	5	1983	414035/702000
Beaver Lake	149	Ware	Chicopee	U	5	1974	421530/721820
Beaver Pond	14	Beverly	Ipswich	U	14	1987	423445/705140
Beck Pond	40	Hamilton	North Shore	S	9	1987	423615/704925
Bell Pond	7	Worcester	Blackstone	U	6	1979	421618/714700
Bellevue Pond	3	Medford	Mystic	U	12	1986	422553/710628
Bemis Pond	14	Hubbardston	Chicopee	U	10	1979	422822/715715
Benton Pond	63	Otis	Farmington	U	2	1979	421102/730250
Bent's Pond	9	Gardner	Millers	U	11	1979	423328/715907
Berkshire Pond	22	Lanesborough	Hoosic	U	11	1981	423020/731146
Big Alum Lake†	189	Sturbridge	Quinebaug	S	8	1980	420834/720714
Big Bearhole Pond	37	Taunton	Taunton	U	8	1983	415150/705900
Big Pond	331	Otis	Farmington	S	10	1979	421137/730232
Billington Sea†	269	Plymouth	South Shore	U	11	1986	415600/704115
Black's Nook†	2.5	Cambridge	Mystic	U	12	1983	422320/710910
Blake's Pond	--	Mansfield	Taunton	U	9	1986	--
Bloody Pond	94	Plymouth	South Shore	S	5	1984	415100/703500

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Boons Pond/Lake Boon†	175	Hudson/Stow	Concord	S	11	1980	422330/713000
Bourn-Hadley Pond	8	Templeton	Millers	U	7	1979	423322/720522
Bower Springs Conservation Area	2	Bolton	Nashua	U	8	1979	422752/713625
Box Pond	46	Bellingham	Charles	U	18	1985	420535/712930
Lake Bray†	12	Holyoke	Connecticut	U	6	1987	421605/723700
Brierly Pond	18	Millbury	Blackstone	U	9	1979	421037/714635
Brigham Pond	45	Hubbardston	Chicopee	U	13	1979	422822/720000
Brockton Reservoir	89	Avon	Taunton	S	8	1975	420658/710318
Brooks Pond	190	Spencer/Oakham New Braintree/ N. Brookfield	Chicopee	S	7	1983	421800/720230
Browning Pond	106	Oakham/Spencer	Chicopee	S	7	1987	421850/715953
Browns Pond†	26	Peabody	North Shore	S	7	1983	423000/705715
Buck Hill Pond	--	Spencer	Chicopee	U	11	1987	--
Buck Pond	25	Westfield	Westfield	S	11	1978	421015/724212
Buckley-Dunton Lake	195	Becket	Westfield	U	7	1978	421830/730515
Lake Buel†	194	Monterey/New Marlborough	Housatonic	S	10	1976	421015/731645
Buffumville Reservoir	186	Charlton/Oxford	French	S	8	1976	420708/715439
Bullough's Pond†	6	Newton	Charles	U	12	1984	422023/711222
Burr's Pond	5	Seekonk	Taunton	S	15	1983	414920/712015
Buttonwood Park Pond†	12	New Bedford	Buzzards Bay	U	9	1984	413600/705740

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Cain Pond	4	Taunton	Taunton	S	12	1987	415130/705845
Camp Putnam Pond	--	New Braintree	Chicopee	U	4	1976	421922/720112
Candlelight Pond	8	Templeton	Millers	U	6	1979	--
Card Pond	12	West Stockbridge	Housatonic	U	4	1978	421935/732200
Carding Mill Pond	40	Sudbury	Concord	U	13	1979	422142/712758
Cedar Pond	21	Falmouth	Cape Cod	U	4	1980	413855/703725
Cedar Pond†	146	Sturbridge	Quinebaug	U	8	1981	420730/720525
Cedar Swamp Pond†	104	Milford	Charles	U	**	1986 D/F	420910/713055
Center Pond	125	Becket	Westfield	S	5	1978	421755/730410
Center Pond	30	Dalton	Housatonic	U	5	1976	422840/730920
Central Pond	139	Seekonk/Pawtucket/ E. Providence, RI	Ten Mile	U	13	1984	415130/712025
Chaffin's Pond	104	Holden	Nashua	U	5	1977	421952/715028
Chandler Pond†	11	Brighton	Charles	U	14	1983	422040/711000
Chartley Pond	38	Norton/Attleboro	Taunton	U	13	1980	415651/711400
Chase Pond	--	Fall River	Mount Hope Bay	U	13	1983	414130/710830
Chauncy Lake†	177	Westborough	Concord	S	6	1974	421737/713648
Chebacco Lake†	209	Hamilton/Essex	North Shore	S	10	1980	423645/704830
Cheshire Reservoir†	418	Cheshire/ Lanesborough	Hoosic	U	7	1980	423200/731130
Chicopee Falls Impoundment	--	Chicopee	Chicopee	U	11	1980	420938/723407
Choate Park Pond	--	Medway	Charles	U	15	1984	420850/712543

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Clapps Pond	40	Provincetown	Cape Cod	U	12	1980	420310/701230
Clara Barton Pond	--	Oxford	French	S	9	1982	420913/715343
Clark Pond	6	Walpole	Neponset	U	10	1984	420817/711432
Cleveland Pond	88	Abington	Taunton	U	12	1980	420715/705855
Cliff Pond	193	Brewster	Cape Cod	S	7	1980	414530/710030
Cobb's Pond	24	Walpole	Neponset	S	9	1984	420938/711443
Lake Cochituate† (Carling, Middle North Basins)	361	Framingham/ Natick/Wayland	Concord	S	12	1980	421805/712210
Lake Cochituate† (South Basin)	233	Natick	Concord	S	10	1980	421725/712210
Coes Reservoir	90	Worcester	Blackstone	U	10	1977	421515/715034
Comins Pond	--	Warren	Quinebaug	U	5	1983	421212/721147
Congamond Lakes (Middle)†	267	Southwick	Westfield	S	13	1978	420135/724524
Congamond Lakes (North)†	48	Southwick	Westfield	S	12	1978	420240/724508
Congamond Lakes (South)†	135	Southwick	Westfield	S	13	1978	420153/724552
Cook Pond	154	Fall River	Mount Hope Bay	S	12	1983	414030/711030
Cook Pond	20	Worcester	Blackstone	U	10	1986	421707/715130
Cooley Lake	91	Granville	Westfield	U	8	1979	420322/725105
Cow Pond	38	Groton	Nashua	S	7	1979	423620/713050
Coy Pond	25	Wenham	North Shore	U	9	1983	423030/704915
Crackrock Pond	14	Foxborough	Neponset	U	13	1984	420500/711520
Cranberry Pond	5	Braintree	Weymouth & Weir	U	7	1981	421015/705932

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Cranberry Pond	8	Tolland	Farmington	S	8	1979	420352/730017
Cranberry Meadow Pond	63	Spencer/Charlton	Chicopee	U	4	1984	421113/720010
Crystal Lake	90	Douglas	Blackstone	U	8	1977	420250/714607
Crystal Lake	36	Orleans	Cape Cod	S	7	1982	414630/695900
Curtis Pond	18	Worcester	Blackstone	U	10	1985	421443/715027
Damon Pond	88	Chesterfield/Goshen	Westfield	U	9	1980	422504/725000
Dark Brook Reservoir	57	Auburn	Blackstone	U	10	1982	421115/715200
Davenport Pond	--	Athol/Petersham	Chicopee	U	9	1982	423237/721207
Davidson Park Pond	--	Winchester	Mystic	U	10	1985	--
Dean Pond	12	Brimfield/Monson	Chicopee	S	9	1984	420605/721610
Lake Denison	82	Winchendon	Millers	U	9	1984	423837/720520
Depot (Long) Pond	25	Eastham	Cape Cod	S	2	1980	414952/695850
Diamond International Impoundment	105	Palmer	Chicopee	U	13	1985	421136/721933
Dimmock Pond†	11	Springfield	Connecticut	U	8	1978	420855/722928
Dodgeville Pond	47	Attleboro	Ten Mile	U	11	1984	415535/711726
Dorothy Pond†	148	Millbury	Blackstone	U	13	1987	421257/714504
Dudley Pond†	84	Wayland	Concord	S	5	1979	421945/712215
Dug Pond	48	Natick	Charles	S	5	1985	421635/712155
Dunn's Pond†	18	Gardner	Millers	S	4	1985	423430/715817
Dutton Pond	6	Leicester	French	U	11	1987	421408/715515
Eagle Lake†	84	Holden	Nashua	U	6	1980	422121/715308
Lake Rohunta (Eagleville Pond)	250	Athol/Orange/ New Salem	Millers	S	10	1981	423300/721622

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Eames Pond	74	Paxton	Chicopee	S	8	1984	421845/715720
East Brimfield Reservoir	420	Brimfield/ Sturbridge	Quinebaug	U	7	1976	420627/720840
East Indies Pond	69	New Marlborough	Housatonic	U	3	1978	420350/731135
East Lake Waushakum†	188	Sterling	Nashua	S	4	1984	422445/714500
Echo Lake	123	Hopkinton	Charles	S	3	1978	421137/713045
Eddy Pond	134	Auburn	Blackstone	U	8	1977	421038/715037
Edgartown Great Pond†*	911	Edgartown	Islands	U	**	1987	412115/70330
Ell Pond†	23	Melrose	Mystic	S	10	1981	422737/710355
Ezekiel Pond	36	Plymouth	Buzzards Bay	U	2	1987	415433/704245
Lake Elizabeth	7	Barnstable	Cape Cod	U	11	1982	413825/702000
Lake Ellis†	67	Athol	Millers	U	9	1979	423430/721222
Evergreen Cemetery Pond	1	Medway	Charles	U	10	1985	--
Factory Pond	45	Hanover/Hanson	South Shore	U	12	1980	420525/705230
Falls Pond	60	North Attleborough	Ten Mile	S	14	1984	415810/711925
Farm Pond	124	Sherborn	Charles	S	6	1983	421400/712045
Farmers Pond	9	Attleboro	Ten Mile	U	14	1984	415709/711807
Farrar Pond	126	Lincoln	Concord	U	5	1986	422450/712116
Fawn Lake†	11	Bedford	Shawshee	U	7	1985	423050/711625
Five Mile Pond†	36	Springfield	Chicopee	S	6	1978	420830/723040
Flannagan (Fletcher) Pond	87	Ayer	Nashua	U	13	1980	423325/713415
Flax Pond	27	Bourne	Cape Cod	U	5	1980	414120/703540
Flax Pond	15	Dennis	Cape Cod	S	1	1980	414250/701115

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Flax Pond†	71	Lynn	North Shore	S	11	1986	422855/705710
Flint Pond (North&South)†	297	Grafton/Shrewsbury	Blackstone	U	9	1977	421500/714413
Flint Pond	61	Tyngsborough	Merrimack	U	7	1985	424022/712600
Floating Bridge Pond†	8	Lynn	North Shore	U	9	1986	422908/705672
Flushing Pond	18	Westford	Merrimack	S	7	1974	423721/712630
Forest Lake†	55	Methuen	Merrimack	S	9	1986	424340/711452
Forge Pond†	68	Granby	Connecticut	U	12	1981	421622/722807
Forge Pond	20	Hanover	South Shore	U	16	1980	420622/705252
Forge Pond†	198	Westford/Littleton	Merrimack	S	11	1974	423434/712924
Fort Meadow Reservoir†	284	Hudson/Marlborough	Concord	S	9	1979	422200/713300
Fort Pond	78	Lancaster	Nashua	S	6	1987	423026/712800
Fort Pond	100	Littleton	Concord	S	10	1980	423025/712800
Fosters Pond	135	Andover/Wilmington	Shawsheen	S	12	1974	423622/710817
Foundry Pond†	8	Hingham	Weymouth & Weir	U	12	1985	421415/705143
Four Mile Pond	25	Boxford	Ipswich	S	5	1987	424108/710044
Fresh Pond	29	Dennis	Cape Cod	U	7	1980	414045/703910
Fresh Pond	62	Plymouth	South Shore	S	9	1985	415415/703320
Frye Pond	7	Haverhill	Merrimack	U	7	1983	424820/710500
Fuller Pond	4	Plainville	Ten Mile	U	10	1978	420047/712058
Furnace Pond†	100	Pembroke	Taunton	U	6	1980	420320/704935
Gallows Pond	43	Plymouth	Buzzards Bay	S	6	1984	415145/703700
Lake Garfield	262	Monterey	Housatonic	S	9	1986	421106/731150
Lake George	93	Wales	Quinebaug	S	8	1976	420330/721252

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Glen Charlie Pond	185	Wareham	Buzzards Bay	U	5	1985	414730/703849
Glen Echo Lake	116	Charlton	French	S	11	1984	420949/715933
Goodrich Pond	13	Pittsfield	Housatonic	S	14	1978	422652/731315
Goodrich Pond	13	Pittsfield	Housatonic	S	14	1978	122652/731315
Goose Pond	38	Chatham	Cape Cod	S	5	1980	414140/700025
Goose Pond	225	Lee/Tyringham	Housatonic	S	2	1976	421650/731145
Gore Pond	169	Charlton/Dudley	French	S	12	1984	420451/715649
Granite Reservoir	198	Charlton	French	U	4	1974	420600/715600
Graves Brook Reservoir (North)	--	Palmer	Chicopee	S	4	1984	420943/721840
Graves Brook Reservoir (South)	--	Palmer	Chicopee	S	6	1984	--
Great Herring Pond	170	Plymouth	South Shore	S	9	1981	414800/703400
Great Pond†	109	Eastham	Cape Cod	S	7	1982	415000/695930
Great Pond	17	Truro	Cape Cod	S	7	1986	--
Green Hill Pond	32	Worcester	Blackstone	U	7	1977	421700/714652
Green's Pond	10	Fitchburg	Nashua	U	11	1979	423622/714807
Greenville Pond	30	Leicester	French	U	13	1987	421223/715522
Greenwater Pond	88	Becket	Housatonic	S	3	1978	421700/730900
Gristmill Pond	16	Sudbury	Concord	U	15	1979	422118/721848
Griswold Pond	13	Saugus	North Shore	U	7	1985	422838/710302
Grove Pond†	67	Ayer	Nashua	S	11	1984	423310/713505
Gull Pond	109	Wellfleet	Cape Cod	S	5	1980	415725/700030

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Hager Pond	28	Marlborough	Concord	U	12	1979	422059/712916
Halfway Pond	232	Plymouth	South Shore	U	7	1984	415110/703700
Halls Pond†	2	Brookline	Charles	S	13	1983	422046/710645
Hamblins Pond†	149	Barnstable	Cape Cod	S	10	1985	415004/702435
Hamilton Reservoir†	413	Holland	Quinebaug	U	12	1982 D/F	420407/720914
Hammond Pond	37	Goshen	Westfield	U	10	1978	422442/724800
Harbor Pond†	42	Townsend	Nashua	S	8	1984	423907/714040
Hardwick Pond	68	Hardwick	Chicopee	S	13	1981	421845/721425
Hardy Pond†	41	Waltham	Charles	U	12	1978	422430/711433
Harris Pond	12	Ludlow	Chicopee	U	11	1979	421040/722935
Haviland Pond	25	Ludlow	Chicopee	S	7	1987	421022/722830
Hayden Pond	41	Dudley	French	S	4	1987	420433/715509
Heard Pond	71	Wayland	Concord	U	11	1987	422110/712300
Heart Pond	91	Chelmsford	Concord	S	7	1979	423355/412315
Hebronville Pond	16	Attleboro	Ten Mile	U	12	1984	415438/711911
Herring Pond†	43	Eastham	Cape Cod	S	9	1979	414930/695910
Highland Lake	15	Norfolk	Charles	S	14	1978	420734/711822
Hills Pond†	--	Arlington	Mystic	U	8	1983	422440/710955
Hinckley Pond	171	Harwich	Cape Cod	S	8	1980	414250/700530
Hobart Pond	15	Whitman	Taunton	U	14	1981	420507/705545
Hobomock Pond	15	Pembroke	South Shore	U	10	1985	420325/704835
Hocomonco Pond	27	Westborough	Concord	U	8	1974	421621/713900
Lake Holbrook†	32	Holbrook	Weymouth & Weir	U	12	1983	420835/710115

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Holland Lake	12	Belchertown	Connecticut	S	8	1978	421850/722555
Holland Reservoir†	65	Holland	Quinebaug	S	5	1976	420445/720955
Hood Pond	67	Topsfield/Ipswich	Ipswich	S	6	1979	424222/705640
Hoosicwhisick Pond	23	Milton	Weymouth & Weir	S	8	1985	421227/710545
Horn Pond†	104	Woburn	Mystic	S	10	1983	422807/710922
Horse Pond	30	Westfield	Westfield	U	5	1978	421034/724152
Houghton's Pond	17	Holliston	Charles	U	13	1978	421247/712545
Howe Pond	11	Spencer	Chicopee	S	8	1984	421247/715957
Hoxie Pond	9	Sandwich	Cape Cod	S	11	1980	414350/702605
Ice House Pond	--	Shirley	Nashua	U	8	1982	423305/713725
Indian Lake†	190	Worcester	Blackstone	S	9	1976	421752/714845
Island Grove Pond	38	Abington	Taunton	U	13	1983	420638/705628
Jacobs Pond	59	Norwell	South Shore	U	8	1979	420943/705058
Jennings Pond†	10	Natick	Charles	U	12	1982	421807/711945
John's Pond	317	Mashpee	Cape Cod	S	10	1980	413739/703114
Johnson's Pond	180	Groveland/Boxford	Merrimack	S	6	1983	424300/710315
Jordan Pond	20	Shrewsbury	Blackstone	U	11	1977	421605/714448
Judkins Pond	6	Winchester	Mystic	U	9	1985	422716/710808
Kendall Pond†	23	Gardner	Millers	S	7	1985	423345/720107
Keyes Pond	40	Westford	Merrimack	S	9	1974	423652/712752
Lackey Pond	117	Uxbridge/ Northbridge	Blackstone	U	12	1977	420543/714125
Lagoon Pond†	535	Oak Bluffs/Tisbury	Islands	U	5	1983	412630/703548

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Lake Lashaway†	270	East Brookfield/ North Brookfield	Chicopee	S	8	1980	421410/720250
Larner Pond	25	Dudley	French	S	9	1987	--
Laurel Lake	51	Erving	Millers	S	6	1985	423715/722215
Laurel Lake	165	Lee/Lenox	Housatonic	S	8	1976	421936/731615
Leach Pond	102	Easton/Sharon	Taunton	U	7	1984	420355/710920
Leadmine Pond	62	Sturbridge	Quinebaug	S	2	1976	420348/720730
Learned Pond	34	Framingham	Concord	U	6	1986	421715/712512
Leverett Pond	7	Brookline	Charles	U	9	1978	421940/710645
Leverett Pond	65	Leverett	Connecticut	U	6	1978	422725/723053
Little Pond	16	Bolton	Concord	U	2	1979	422525/713915
Little Alum Pond	73	Brimfield	Quinebaug	S	6	1986	420750/720908
Little Fresh Pond	--	Cambridge	Mystic	U	9	1983	422305/710920
Little Harbor Pond*	--	Cohasset	South Shore	--	--	1986	421500/704810
Little Long Pond	45	Plymouth	Buzzards Bay	U	6	1984	415210/703650
Little Nugget Lake	14	Charlton	French	S	8	1984	421018/715700
Little Sandy Bottom Pond†	62	Pembroke	South Shore	U	7	1985	420230/704957
Little Sandy Pond	29	Plymouth	Buzzards Bay	U	1	1987	--
Little West Pond	25	Plymouth	Buzzards Bay	U	8	1987	415517/704224
Long Pond	44	Ayer	Nashua	S	12	1984	423415/713224
Long Pond†	88	Littleton	Concord	S	9	1986	423030/712815
Long Pond†	50	Barnstable	Cape Cod	U	7	1983	414000/702640
Long Pond†	163	Dracut/Tyngsborough	Merrimack	U	8	1983	424130/712215

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Long Pond†	18	Springfield	Chicopee	U	12	1987	420915/723037
Long Pond	34	Wellfleet	Cape Cod	S	2	1980	415640/700030
Long Pond†	59	Yarmouth	Cape Cod	S	12	1986-D/F	414010/701153
Long Sought-for Pond	106	Westford	Merrimack	S	6	1974	423715/712710
Loon Pond†	29	Springfield	Connecticut	U	6	1978	420837/723000
Lost Pond	2	Brookline	Charles	U	12	1978	421852/711030
Lost Lake/Knops Pond†	204	Groton	Nashua	S	7	1978	423518/713126
Lake Lorraine†	27	Springfield	Chicopee	S	7	1978	420845/723050
Louisa Lake	19	Milford	Charles	U	8	1985	420922/713120
Lout Pond	18	Plymouth	South Shore	S	4	1985	415607/704015
Lowe Pond	32	Boxford	Ipswich	U	5	1978	424035/705908
Lower Ashworth Pond (Sibley Pond-South)	19	Charlton	Quinebaug	S	12	1984	420900/720040
Lower College Pond	6	South Hadley	Connecticut	S	5	1984	421515/723423
Lower Highland Lake	88	Goshen	Connecticut	U	2	1985	422652/724755
Lower Mill Pond	29	Brewster	Cape Cod	U	10	1987	--
Lower Mill Pond	32	Easthampton	Connecticut	U	10	1978	421620/723930
Lower Mystic Lake	111	Arlington/Medford	Mystic	S	15	1978	422535/710850
Lower Naukeag Lake	260	Ashburnham	Millers	U	6	1979	424000/715230
Lower Pond	19	Saugus	North Shore	U	8	1985	422920/710212
Manchaug Pond	348	Douglas/Sutton	Blackstone	S	3	1977	420600/714637
Lake Mansfield†	25	Great Barrington	Housatonic	U	8	1986	421210/732205

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Maquan Pond	45	Hanson	South Shore	U	7	1982	420345/703730
Mare Pond	14	Plymouth	South Shore	U	5	1982	414622/703730
Martins Pond†	92	North Reading	Ipswich	U	10	1981	423545/710730
Mascuppic Lake†	209	Dracut/Tyngsborough	Merrimack	S	14	1981	424037/712300
Mashpee/Wakeby Ponds†	729	Mashpee	Cape Cod	S	7	1986	414000/702915
Massapoag Pond†	353	Sharon	Neponset	S	7	1977	420615/711037
Matfield Impoundment	--	East Bridgewater	Taunton	U	13	1986	--
Lake Mattawa	112	Orange	Chicopee	S	5	1976	423400/721922
McTaggart's Pond	9	Fitchburg	Nashua	U	7	1979	423440/715045
Mechanics Pond	9	Attleboro	Ten Mile	U	14	1984	415654/711743
Memorial Park Pond	--	Taunton	Taunton	U	13	1983	415325/710535
Merino Pond	72	Dudley	French	U	5	1987	420302/715406
Metacomet Lake†	74	Belchertown	Connecticut	U	7	1978	421822/722555
Mill Pond	34	Littleton	Merrimack	U	12	1987	423210/713008
Mill Pond	107	Sheffield	Housatonic	U	7	1986	420713/732147
Mill Pond†	17	West Newbury	Merrimack	S	11	1983	424815/705315
Mill Pond	2	Winchester	Mystic	U	8	1985	422707/710808
Minechoag Pond	21	Ludlow	Chicopee	U	9	1987	420945/722735
Lake Mirimichi†	170	Plainville/ Foxborough	Taunton	S	**	--	420135/711738
Mirror Lake	7	Fitchburg	Nashua	U	8	1979	423337/714805
Mirror Lake	55	Wrentham/Norfolk	Charles	U	10	1978	420517/711932
Mona Lake†	11	Springfield	Chicopee	S	15	1987	420835/723115

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Lake Monomonac	592	Winchendon/Rindge, NH	Millers	U	7	1976	424250/720030
Monponsett Pond (East)†	246	Halifax	Taunton	U	7	1982	420015/705015
Monponsett Pond (West)†	282	Halifax	Taunton	U	13	1982	420030/705045
Moore's Pond	31	Warwick	Millers	5	3	1987	423922/722052
Morses Pond	116	Wellesley/Natick	Charles	S	12	1983	421755/711910
Mossy Pond	28	Clinton	Nashua	S	8	1977	422506/714204
Muddy Pond	64	Carver	Taunton	U	9	1987	415447/704719
Mumford River Impoundment	9	Douglas	Blackstone	U	6	1984	420430/713712
Murphy Pond	8	Ludlow	Chicopee	U	10	1982	421017/722937
Musquashcut Pond	71	Scituate	South Shore	U	12	1983	421345/704540
Nabnasset Pond	115	Westford	Merrimack	U	7	1977	423700/712530
Nashawannuck Pond†	22	Easthampton	Connecticut	S	11	1981	421540/724000
Neponset Reservoir†	268	Foxborough	Neponset	U	11	1986	420505/711445
New Long Pond	23	Plymouth	Buzzards Bay	U	9	1984	415110/704045
Nine Mile Pond	32	Wilbraham	Connecticut	S	10	1978	420852/722607
Nipmuc Pond	85	Mendon	Blackstone	S	6	1977	420545/713415
Nippenicket Lake	354	Bridgewater	Taunton	U	7	1975	415815/710230
Noannet Pond	58	Westwood/Dover	Charles	U	5	1985	--
Lake Noquochoke	124	Dartmouth	Buzzards Bay	S	13	1979	413900/710230
North Pond†	239	Hopkinton/Milford	Blackstone	S	11	1984 D/F	421055/713345
North Spectacle Pond	30	New Salem	Millers	S	9	1979	423115/721610
North Watuppa Pond	1700	Fall River/Westport	Mount Hope Bay	U	2	1980	414230/710615

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Norton Reservoir†	529	Mansfield/Norton	Taunton	U	9	1987	415906/711204
Norwich Pond	122	Huntington	Westfield	S	9	1978	421823/724957
Noyes Pond	166	Tolland	Farmington	U	3	1979	420622/730136
Nutting Lake	78	Billerica	Concord	U	14	1985	423210/711615
Oldham Pond†	235	Pembroke	South Shore	U	6	1980	420405/705009
Onota Lake†	617	Pittsfield	Housatonic	S	4	1976	422815/731700
Orange Impoundment	--	Orange	Millers	U	14	1987	423522/721822
Otis Reservoir	1200	Otis	Farmington	S	5	1979	420905/730222
The Oxbow	212	Northampton	Connecticut	U	16	1978	421730/723800
Packard Pond	34	Orange	Millers	S	7	1979	423800/721400
Parker Pond†	26	Gardner	Millers	U	11	1986	421610/715108
Partridge Pond	23	Westminster	Nashua	U	9	1979	423215/715625
Partridgeville Pond	39	Templeton	Millers	U	6	1979	423245/720245
Patch Pond	3	Worcester	Blackstone	U	8	1979	421552/715100
Patch Reservoir†	31	Worcester	Blackstone	S	11	1986	423445/720043
Patch Pond	3	Worcester	Blackstone	U	8	1979	421552/715100
Patch Reservoir†	31	Worcester	Blackstone	S	11	1986	421610/715108
Lake Pearl	218	Wrentham	Charles	S	12	1983	420350/712107
Pelham Lake	71	Rowe	Deerfield	U	10	1977	424200/725322
Pentucket Pond	85	Georgetown	Parker	S	11	1983	424403/705950
Pepperell Pond	--	Pepperell	Nashua	U	15	1981	423845/713500
Pequot Pond†	154	Westfield	Westfield	S	4	1978	421105/724140
Peter Pond	44	Dudley	French	S	10	1987	420345/715345

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Peter's Pond	77	Dracut	Merrimack	S	11	1979	424300/711537
Pierce Pond	25	Leominster	Nashua	U	4	1986	423250/714700
Pierpoint Meadow Pond	90	Charlton/Dudley	French	U	7	1983	420505/715459
Pilgrim Lake	39	Orleans	Cape Cod	S	5	1980	414552/695845
Pillings Pond	96	Lynnfield	North Shore	U	13	1977	423145/710145
Pinewood Pond†	24	Stoughton	Neponset	U	7	1987	420746/710825
Palinfield Pond	57	Plainfield	Deerfield	U	3	1977	423230/725730
Plunkett Reservoir	73	Hinsdale	Housatonic	S	3	1976	422530/730745
Pomps Pond†	17	Andover	Shawsheen	U	13	1987	420007/710905
Pondville Pond	41	Auburn/Millbury	Blackstone	U	11	1977	421127/714900
Pontoosuc Lake†	480	Pittsfield/ Lanesborough	Housatonic	S	11	1976	422952/731455
Populatic Pond	40	Norfolk	Charles	U	10	1987	420749/712250
Porter Lake†	28	Springfield	Connecticut	U	15	1979	420622/723352
Powissett Pond	6	Westwood/Dover	Charles	U	8	1985	421400/711453
Prindle Pond†	71	Charlton	Quinebaug	U	8	1983	420645/715945
Prospect Lake	55	Egremont	Housatonic	U	6	1985	421140/732710
Puffer's Pond† (Factory Hollow Pond)	11	Amherst	Connecticut	U	6	1984-D/F	422455/723110
Putnam Pond	4	Fitchburg	Nashua	U	10	1979	423550/714715
Quaboag Pond†	531	Brookfield/ East Brookfield	Chicopee	U	8	1980	421148/720410

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Quacumquasit Pond†	218	Brookfield/ East Brookfield/ Sturbridge	Chicopee	S	6	1975	421021/720422
Lake Quannapowitt†	250	Wakefield	North Shore	U	11	1986-D/F	423053/710440
Queen Lake†	138	Phillipston	Chicopee	U	1	1979	423200/720700
Queen Sewell Pond	18	Bourne	Cape Cod	U	2	1980	414520/703615
Lake Quinsigamond†	475	Worcester/ Shrewsbury	Blackstone	S	11	1980	421626/714522
Ramshorn Pond	117	Millbury/Sutton	Blackstone	S	3	1977	420915/714830
Red Bridge Impoundment†	83	Ludlow/Wilbraham/ Palmer	Chicopee	S	9	1985	421052/722408
Red Lily Pond†	4	Barnstable	Cape Cod	U	12	1982	414325/701955
Rice City Pond	91	Uxbridge	Blackstone	U	15	1985	420550/713724
Richards Reservoir	30	Warwick	Millers	U	10	1987	424151/721910
Richmond Pond†	218	Pittsfield/Richmond	Housatonic	S	5	1976	422450/731915
Lake Ripple†	63	Grafton	Blackstone	U	9	1986-D/F	421235/714155
Riverdale Pond (New dam has increased area)	18	Northbridge	Blackstone	S	13	1985	420820/713827
Robbins Pond	124	Bridgewater	Taunton	U	5	1975	420015/705428
Robinson Pond	6	Mansfield	Taunton	U	9	1986	420012/711547
Robinson Pond	98	Oxford	French	U	4	1976	420620/714948

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Rochdale Pond	41	Leicester	French	S	8	1987	421152/715430
Rock Pond	42	Georgetown	Parker	S	12	1983	424343/710020
Rockwell Pond	10	Leominster	Nashua	U	8	1977	423139/714607
Rocky Pond	60	Boylston	Concord	S	2	1974	422047/714119
Rosemary Lake	12	Needham	Charles	U	10	1979	421710/711420
Round Pond	10	Plymouth	Buzzards Bay	U	5	1984	415136/703618
Rubber Thread Pond	--	Easthampton	Connecticut	U	11	1978	421552/724022
Rudd Pond	80	Becket	Westfield	S	6	1978	421745/730453
Ruggles Pond	19	Wendell	Millers	U	9	1984	423253/722653
Russell Pond	85	Russell	Westfield	S	8	1978	420919/725158
Ryder Pond	18	Truro	Cape Cod	S	5	1986	415800/700155
Lake Sabbatia	237	Taunton	Taunton	S	11	1980	415640/710627
Salisbury Pond†	17	Worcester	Blackstone	U	16	1983	421636/714823
Salt Pond*	62	Falmouth	Cape Cod	S	12	1980	413235/703735
Lake Samoset	44	Leominster	Nashua	S	8	1983	422930/714540
Sandy Pond	74	Ayer	Nashua	S	6	1980	423342/713322
Santuit Pond†	172	Mashpee	Cape Cod	U	13	1987	413915/702730
Sargent Pond	2	Brookline	Charles	U	10	1982	421915/710741
Sargents Pond	69	Leicester	French	U	6	1978	421455/715500
Sassaquin Pond	34	Acushnet	Buzzards Bay	S	5	1980	414406/705659
Sawdy Pond	363	Westport/Tiverton/ Fall River	Mount Hope Bay	U	3	1983	413700/710815

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Sawmill Pond	61	Fitchburg	Nashua	U	14	1981	423237/715052
Scarborough Pond†	7	Boston	Charles	U	11	1986	--
Scargo Pond	53	Dennis	Cape Cod	S	5	1982	414450/701100
School Pond	--	Boston	Charles	U	11	1981	421730/711000
Schoolhouse Pond	21	Chatham	Cape Cod	S	2	1980	414140/695950
Seth's Pond	11	West Tisbury	Islands	U	3	1983	412600/703950
Shaker Mill Pond	6	West Stockbridge	Housatonic	U	4	1978	422022/732215
Shallow Pond†	67	Barnstable	Cape Cod	U	8	1983	414040/701930
Shaw Pond	100	Becket/Otis	Farmington	S	5	1986	421520/730731
Sheep Pond†	148	Brewster	Cape Cod	S	4	1986	414415/700405
Sherman Pond	86	Brimfield	Quinebaug	S	8	1985	420806/721140
Sherman Reservoir	162	Monroe/Rowe/ Whitingham, VT	Deerfield	S	4	1977	424400/725540
Lake Shirley†	376	Lunenburg/Shirley	Nashua	S	11	1977	423320/714115
Shubael Pond	56	Barnstable	Cape Cod	S	6	1980	414020/702337
Silver Lake	10	Agawam	Connecticut	S	13	1982	420352/723807
Silver Lake	70	Bellingham	Blackstone	U	7	1978	420345/712755
Silver Lake	23	Grafton	Blackstone	U	10	1980	421137/713919
Silver Lake†	28	Wilmington	Ipswich	S	9	1984	423357/721116
Singing Dam Pond	--	Sutton	Blackstone	U	16	1985	420939/714645
Singletary Pond†	330	Millbury/Sutton	Blackstone	S	8	1985	420939/714645
Slater's Pond	107	Oxford	French	S	4	1976	420700/714922

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Sluice Pond†	50	Lynn	North Shore	S	6	1986	422920/705800
Snake Pond	83	Sandwich	Cape Cod	U	3	1980	414100/703115
Snow's Mill Pond	35	Fitchburg	Nashua	U	6	1981	423338/715115
South Athol Lake	76	Athol	Millers	U	8	1979	423215/721530
South End Pond	30	Millis	Charles	U	9	1983	421145/712100
South Meadow Pond (East)		Clinton	Nashua	S	9	1977	422455/714248
South Meadow Pond (West)	68	Clinton/Lancaster	Nashua	U	9	1977	422453/714225
South Spectacle Pond	37	New Salem	Millers	S	11	1979	423052/721607
South Watuppa Pond	1283	Fall River/ Westport	Mount Hope Bay	U	9	1980	413937/710745
Spectacle Lake	16	Wilbraham	Chicopee	S	10	1986	420857/722515
Spectacle Pond	58	Lancaster	Nashua	S	8	1987	423045/714100
Spectacle Pond	70	Littleton/Ayer	Nashua	S	10	1987	423042/714100
Sportsman's Pond	102	Athol	Millers	U	10	1979	423632/721352
Spring Pond	9	Saugus	North Shore	U	11	1985	422848/710307
Spy Pond†	103	Arlington	Mystic	S	16	1981	422430/710919
Stearn's Mill Pond	19	Sudbury	Concord	U	14	1986	422309/712715
Stetson Pond†	93	Pembroke	Taunton	S	7	1985	420145/704940
Stiles Pond	60	Boxford	Ipswich	S	8	1978	424120/710215
Stiles Reservoir	346	Leicester/Spencer	French	S	9	1983	421242/715655
Stockbridge Bowl†	374	Stockbridge	Housatonic	S	9	1976	422020/731830
Stoneville Reservoir	55	Auburn	Blackstone	U	5	1980	421230/715136

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Straits Pond	91	Cohasset/Hull	Weymouth & Weir	U	9	1979	421554/705015
Sugden Reservoir***	83	Spencer	Chicopee	S	11	1987	421615/715807
Sunset Lake	300	Ashburnham	Millers	S	12	1979	424100/715830
Sunset Lake	5	Oak Bluffs	Islands	U	9	1976	412720/703348
Sunset Lake	57	Braintree	Weymouth & Weir	S	8	1979	421209/710045
Sweet's Pond†	18	Mansfield	Taunton	U	6	1986	--
Lake Tashmoo†*	259	Tisbury	Islands	U	--	1986	412730/703730
Ten Mile Reservation	--	Pawtucket, RI	Ten Mile	U	15	1984	--
Terry Brook Reservoir	10	Freetown	Taunton	S	10	1983	414640/710455
Texas Pond	27	Oxford	French	U	11	1987	421017/715338
Thayer Pond	9	Oxford	French	U	13	1983	420930/715305
The Reservoir	7	Harwich	Cape Cod	U	9	1980	--
Thirty Acre Pond	30	Brockton	Taunton	U	4	1975	420543/710245
Thompson Lake	32	Palmer	Chicopee	U	5	1987	421030/721758
Thompson's Pond	117	Spencer	Chicopee	S	7	1984	421810/715825
Tinkham Pond	20	Acushnet/ Mattapoisett	Buzzards Bay	U	14	1980	414100/705130
Tisbury Great Pond†*	772	West Tisbury	Islands	U	--	1986	412100/703900
Todd Pond	5	Lincoln	Charles	S	14	1985	422442/711907
Tripps Pond	6	Hudson	Concord	U	8	1982	422323/713437
Tully Pond	32	Orange	Millers	S	7	1979	423815/721430
Turner Pond	55	Dartmouth/ New Bedford	Buzzards Bay	U	12	1980	414055/705836

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Turner Reservoir	124	E. Providence, RI	Ten Mile	U	11	1984	--
Turnpike Lake†	115	Plainville	Ten Mile	U	6	1979	420100/711620
Uncas Pond	18	Franklin	Charles	S	9	1985	420345/712243
Upper College Pond	11	South Hadley	Connecticut	S	8	1984	421530/723420
Upper Goose Pond	45	Lee/Tyringham	Housatonic	S	4	1976	421705/731040
Upper Highland Lake	53	Goshen	Connecticut	U	4	1985	422737/724755
Upper Mill Pond	253	Brewster	Cape Cod	U	11	1987	414345/700700
Upper Mystic Lake†	167	Winchester/ Arlington/Medford	Mystic	S	15	1978	422615/710900
Upton's Pond	7	Tyngsborough	Merrimack	S	11	1979	424015/712525
Van Horn Pond†	9	Springfield	Connecticut	S	13	1978	420730/723550
Venture Pond†	7	Springfield	Connecticut	S	15	1987	420653/723024
Village Pond	6	Truro	Cape Cod	U	11	1987	420158/700525
Lake Waban	108	Wellesley	Charles	S	9	1978	421719/711834
Waite Pond	54	Leicester	Blackstone	U	5	1977	421500/715330
Walden Pond†	58	Concord	Concord	S	4	1985	422620/712025
Waldo Pond	70	Avon/Brockton	Taunton	U	7	1975	420634/710253
Walker Pond†	94	Sturbridge	Quinebaug	U	5	1976	420819/720339
Walker Pond	7	Watertown	Charles	U	9	1978	422220/711242
Walkers Pond	105	Brewster	Cape Cod	U	10	1987	414320/700307
Wallum Lake	322	Douglas/ Burrillville, RI	Blackstone	S	2	1977	420006/714608
Wampatuck Pond	65	Hanson	Taunton	U	10	1980	420339/705203

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
Ward Pond	51	Ashburnham	Millers	S	13	1979	424050/715300
Ware Impoundment	--	Ware	Chicopee	S	11	1980	421549/721344
Warner's Pond	54	Concord	Concord	S	10	1974	422750/712409
Warner's Pond	68	Hadley	Connecticut	U	12	1979	422322/723430
Lake Watatic	28	Ashburnham	Millers	U	11	1979	424115/715615
Watershops Pond	157	Springfield	Connecticut	S	10	1978	420615/723300
Wattles Pond	10	Groton	Nashua	S	10	1979	423910/713405
Waushakum Pond†	81	Ashland/Framingham	Concord	S	8	1984	421545/712545
Webster Lake	1181	Webster	French	S	6	1979	420230/715045
Wedge Pond†	21	Winchester	Mystic	S	13	1985	422717/710828
Weld Pond	27	Dedham	Charles	U	7	1986	421500/711210
Wequaquet Lake†	654	Barnstable	Cape Cod	U	5	1980	414015/722030
Western Mass. Electric Impoundment	--	Ludlow/Wilbraham	Chicopee	S	8	1980	420915/722850
West Pond	19	Bolton	Concord	S	8	1979	422540/713450
West Pond	7	Gloucester	North Shore	U	11	1986	423450/704235
West Waushakum Pond	112	Sterling	Nashua	S	7	1977	422455/714553
Wetherells Pond	13	Plainville	Ten Mile	U	14	1984	420000/712015
Whalom Pond	99	Leominster/ Lunenburg	Nashua	S	6	1977	423427/714530
Wheeler's Pond	22	Erving	Millers	U	7	1979	423720/721935
Whitehall Pond	--	Rutland	Chicopee	S	5	1984	--
Whitehall Reservoir	575	Hopkinton	Concord	S	9	1983	421345/713430

CLASSIFIED LAKES AND PONDS (CONTINUED)

LAKE/POND	AREA (acres)	LOCATION	DRAINAGE BASIN	STRATI-FICATION	SEVERITY POINTS	MOST RECENT DATE SURVEYED	LATITUDE/ LONGITUDE
White Pond	67	Athol	Millers	S	10	1979	423300/721530
White Pond	43	Concord	Concord	S	5	1979	422545/712330
White Pond	43	Lancaster	Nashua	U	7	1979	423043/714300
White Island Pond	294	Plymouth/Wareham	Buzzards Bay	S	13	1985	--
Whitman's Pond†	210	Weymouth	Weymouth & Weir	S	10	1981	421215/705615
Whitney Pond	107	Winchendon	Millers	S	10	1979	424050/720200
Wickaboag Pond	320	West Brookfield	Chicopee	U	10	1985	421430/720915
Willow Lake†	4	Northampton	Connecticut	U	6	1982	422052/724130
Willow Pond	1	Brookline	Charles	U	7	1978	421957/710650
Windsor Pond	44	Windsor	Westfield	S	8	1978	422915/730626
Winnecunnet Pond	148	Norton	Taunton	U	8	1980	415815/710752
Winnekeag Lake	118	Ashburnham	Nashua	S	10	1980	423940/715400
Winning Pond	23	Billerica	Concord	S	10	1987	423305/711810
Winter Pond	17	Winchester	Mystic	U	12	1985	422727/710912
Lake Winthrop†	150	Holliston	Charles	S	9	1979	421118/712520
Woods Pond	122	Lenox	Housatonic	U	17	1981	422119/731424
Woods Pond	52	Middleborough	Taunton	U	6	1985	--
Wrights Reservoir	128	Gardner/Westminster	Millers	U	7	1987	423245/715815
Wyman Pond†	200	Westminster	Nashua	S	12	1981	423134/715236
Lake Wyola	129	Shutesbury	Connecticut	S	9	1978	423000/722545
Yokum Pond	109	Becket	Westfield	U	3	1978	421815/730730

LISTING OF HIGH ACIDITY LAKES AND PONDS

Table 1. List of ponds on Palis[1] database with an in-lake surface pH of 4.5 or less measured on at least one sampling occasion.

PALIS NUMBER	NAME OF LAKE	TOWN	DATE SURVEYED	ALKA-LINITY (mg/l)	pH (Standard Units)
95173	White Island Pond	Plymouth	06/14/77	***	2.9
35072	Ruggles Pond	Wendell	07/11/84	1.0	4.1
62114	Memorial Park Pond	Taunton	06/22/83	***	4.1
96179	Long Pond	Wellfleet	07/28/80	***	4.1
94176	Gallows Pond	Plymouth	06/26/84	2.0	4.4
96035	Clapps Pond	Provincetown	07/28/80	***	4.4
34005	Arcadia Lake	Belchertown	08/31/78	0.0	4.5
96101	Fresh Pond	Dennis	07/31/80	0.0	4.5
97096	Tom Nevers Pond	Nantucket	09/20/78	0.0	4.5

*** Missing data

[1] Ponds And Lakes Information System

Table 2. List of ponds on PALIS database with an in-lake surface total alkalinity value of 2.0 mg/l or less measured on at least one occasion.

PALIS NUMBER	NAME OF LAKE	TOWN	DATE SURVEYED	ALKA-LINITY (mg/l)	pH (Standard Units)
34005	Arcadia Lake	Belchertown	08/31/78	0.0	4.5
96101	Fresh Pond	Dennis	07/31/80	0.0	4.5
97096	Tom Nevers Pond	Nantucket	09/20/78	0.0	4.5
95148	Tinkham Pond	Mattapoisett	08/28/80	0.0	4.7
97053	Maxcy Pond	Nantucket	09/18/78	0.5	4.6
35072	Ruggles Pond	Wendell	07/11/84	1.0	4.1
95151	Turner Pond	New Bedford	06/25/80	1.0	4.6
96090	Flax Pond	Dennis	07/31/80	1.0	4.8
35057	Partridgeville Pond	Templeton	09/11/79	1.0	4.9
97028	Gibbs Pond	Nantucket	09/20/78	1.0	5.2
81035	East Waushacum Pond	Sterling	08/20/80	1.0	6.2
94096	Maquan Pond	Hanson	08/31/82	1.0	6.2
96285	Shallow Pond	Barnstable	08/03/83	1.5	4.8
94176	Gallows Pond	Plymouth	06/26/84	2.0	4.4
35086	Sunset Lake	Ashburnham	08/27/79	2.0	5.1
35095	Watatic Pond	Ashburnham	08/28/79	2.0	5.1
95123	Round Pond	Plymouth	06/28/84	2.0	5.5
81161	Wyman Pond	Westminster	10/15/80	2.0	5.7
74007	Cranberry Pond	Braintree	08/31/81	2.0	5.8
62131	Lake Nippenicket	Bridgewater	07/23/75	2.0	5.8
35041	Lower Naukeag Lake	Ashburnham	08/27/79	2.0	5.8
36132	Queen Lake	Phillipston	05/02/79	2.0	5.9
35101	Whitney Pond	Winchendon	09/17/79	2.0	6.0
95166	White Island Pond-East	Plymouth	07/28/77	2.0	6.1
96140	Hinckleys Pond	Harwich	07/30/80	2.0	6.4
81127	Snows Millpond	Fitchburg	09/01/81	2.0	7.3
72039	Farm Pond	Sherborn	07/21/83	2.0	***

*** Missing data

Table 3. List of ponds on PALIS database with an in-lake total alkalinity value greater than 2.0 mg/l and less than 6.0 mg/l measured on at least one occasion.

PALIS NUMBER	NAME OF LAKE	TOWN	DATE SURVEYED	ALKA-LINITY (mg/l)	pH (Standard Units)
81157	Winnekeag Lake	Ashburnham	09/29/80	3.0	4.7
34035	Lake Holland	Belchertown	08/31/78	3.0	5.1
81073	Long Pond	Ayer	07/16/84	3.0	5.3
62187	Terry Brook Pond	Freetown	08/30/83	3.0	5.5
94097	Mare Pond	Plymouth	07/13/82	3.0	5.8
97085	Seths Pond	West Tisbury	12/14/76	3.0	5.9
35035	Laurel Lake	Erving	09/18/79	3.0	6.0
62162	Robbins Pond	East Bridgewater	07/24/75	3.0	6.0
96123	Gull Pond	Wellfleet	07/28/80	3.0	6.1
96061	Depot Pond	Eastham	07/29/80	3.0	6.2
96253	Queen Sewell Pond	Bourne	08/14/80	3.0	6.2
36053	Dimmock Pond	Springfield	07/11/78	3.0	6.4
96329	Village Pond	Truro	07/28/80	3.0	6.5
95173	White Island Pond-West	Plymouth	08/11/76	3.0	6.5
62103	Leach Pond	Easton	06/05/84	4.0	4.7
35015	Davenport Pond	Petersham	08/11/82	4.0	4.8
35047	Lake Monomonac	Winchendon	03/09/76	4.0	4.9
94015	Bloody Pond	Plymouth	06/26/84	4.0	5.4
35017	Lake Denison	Winchendon	07/11/84	4.0	5.7
36012	Bemis Road Pond	Hubbardston	07/02/79	4.0	5.9
35094	Ward Pond	Ashburnham	08/28/79	4.0	5.9
95112	New Long Pond	Plymouth	06/28/84	4.0	6.1
36172	Camp Putnam Pond	New Braintree	06/09/76	4.0	6.2
81084	Mirror Lake	Fitchburg	07/26/79	4.0	6.2
42047	Robinson Pond	Oxford	06/21/76	4.0	6.2
35081	South Spectacle Pond	New Salem	08/30/79	4.0	6.2
96333	Wequaquet Lake	Barnstable	08/11/80	4.0	6.2
35053	Packard Pond	Orange	09/20/79	4.0	6.3
96293	Shubael Pond	Barnstable	08/12/80	4.0	6.3
96008	Baker Pond	Orleans	07/30/80	4.0	6.4
96289	Sheep Pond	Brewster	08/30/80	4.0	6.5
81051	Greenes Pond	Fitchburg	07/18/79	4.0	6.6
32061	Russell Pond	Russell	06/22/78	4.0	6.6
35082	Sportsmans Pond	Athol	08/09/79	4.0	6.6
96087	Flax Pond	Bourne	08/14/80	4.0	6.7
82118	White Pond	Concord	06/07/79	4.0	6.7
72140	Lake Winthrop	Holliston	07/24/79	4.0	6.8
96194	Mashpee & Wakeby Ponds	Mashpee	08/12/80	4.0	6.8
35070	Lake Rohunta	Athol	08/04/81	4.0	6.9
34103	Lake Wyola	Shutesbury	07/13/78	4.0	7.0
93056	Pillings Pond	Lynnfield	04/28/77	5.0	5.5
34096	Venture Pond	Springfield	08/15/79	5.0	5.6
95113	Noquochoke Lake-Middle	Dartmouth	08/06/79	5.0	5.7
42064	Webster Lake	Webster	07/01/76	5.0	5.8
81054	Harbor Pond	Townsend	06/07/84	5.0	5.9

Table 3. (Continued)

PALIS NUMBER	NAME OF LAKE	TOWN	DATE SURVEYED	ALKA-LINITY (mg/l)	pH (Standard Units)
97019	Duarte Pond	Oak Bluffs	02/17/76	5.0	6.0
36084	Lake Lorraine	Springfield	08/07/78	5.0	6.0
81034	Eagle Lake	Holden	04/23/79	5.0	6.3
42018	Gore Pond	Dudley	06/23/76	5.0	6.3
42053	Slaters Pond	Oxford	06/22/76	5.0	6.3
82120	Whitehall Reservoir	Hopkinton	08/25/83	5.0	6.3
81082	McTaggarts Pond	Fitchburg	07/19/79	5.0	6.5
81098	Partridge Pond	Westminster	08/29/79	5.0	6.5
36150	Sugden Reservoir	Spencer	04/23/80	5.0	6.5
94114	Oldham Pond	Pembroke	07/16/80	5.0	6.6
96012	Bearse Pond	Barnstable	08/03/83	5.0	6.7
96039	Cliff Pond	Brewster	07/29/80	5.0	6.7
35023	Ellis Pond	Athol	08/08/79	5.0	6.7
97054	Menemsha Pond	Gay Head	12/14/76	5.0	6.7
36092	Lake Mattawa	Orange	06/18/75	5.0	6.8
96279	Scargo Lake	Dennis	08/24/82	5.0	6.8
72035	Echo Lake	Milford	07/25/78	5.0	7.3
36052	Diamond International Impoundment	Palmer	08/19/80	5.0	7.5
34073	Porter Lake	Springfield	08/15/79	5.0	7.5
35034	Kendall Pond	Gardner	09/11/79	5.5	5.9

Table 4. List of ponds on PALIS database with an in-lake total alkalinity value equal to or greater than 6.0 mg/l and less than or equal to 10.0 mg/l measured on at least one occasion.

PALIS NUMBER	NAME OF LAKE	TOWN	DATE SURVEYED	ALKA-LINITY (mg/l)	pH (Standard Units)
96184	Long Pond	Barnstable	08/15/83	6.0	5.2
36082	Long Pond	Rutland	06/13/84	6.0	5.4
95096	Long Pond	Plymouth	08/01/84	6.0	5.6
36173	White Pond	Rutland	06/13/84	6.0	5.6
95171	Noquochoke Lake-North	Dartmouth	08/06/79	6.0	5.7
42055	Stiles Reservoir	Spencer	07/05/83	6.0	5.7
36061	Five Mile Pond	Springfield	08/07/78	6.0	6.2
35097	Wheelers Pond	Warwick	09/18/79	6.0	6.3
42024	Hayden Pond	Dudley	06/24/76	6.0	6.4
35052	North Spectacle Pond	New Salem	08/30/79	6.0	6.4
72030	Silver Lake	Newton	02/05/80	6.0	6.4
35078	South Athol Lake	Athol	08/07/79	6.0	6.4
96050	Crystal Lake	Orleans	08/02/82	6.0	6.5
96157	Johns Pond	Mashpee	08/13/80	6.0	6.5
82071	Little Pond	Bolton	06/12/79	6.0	6.5
34051	Metacomet Lake	Belchertown	08/31/78	6.0	6.5
41008	Cedar Pond	Sturbridge	04/17/80	6.0	6.6
42067	Clara Barton Pond	Oxford	08/30/82	6.0	6.6
96146	Hoxie Pond	Sandwich	08/12/80	6.0	6.6
42043	Pierpoint Meadow Pond	Dudley	08/31/83	6.0	6.6
31008	Cranberry Pond	Tolland	08/01/79	6.0	6.7
96106	Goose Pond	Chatham	07/30/80	6.0	6.7
35048	Moores Pond	Warwick	09/24/79	6.0	6.7
31004	Big Pond	Otis	07/30/79	6.0	6.8
35021	Dunn Pond	Gardner	09/13/79	6.0	6.8
31027	Otis Reservoir	Otis	07/31/79	6.0	6.8
35098	White Pond	Athol	08/07/79	6.0	6.8
32076	Windsor Pond	Windsor	08/09/78	6.0	6.8
94057	Halfway Pond	Plymouth	06/26/84	7.0	5.3
32040	Hammond Pond	Goshen	08/10/78	7.0	6.2
95088	Little Long Pond	Plymouth	06/27/84	7.0	6.3
36130	Quaboag Pond	Brookfield	02/10/75	7.0	6.3
84053	Peters Pond	Dracut	06/28/79	7.0	6.5
81107	Putnam Pond	Fitchburg	07/19/79	7.0	6.5
95170	Noquochoke Lake-South	Dartmouth	08/06/79	7.0	6.7
81017	Chaffin Pond	Holden	06/28/77	7.0	6.8
36131	Quacumquasit Pond	Brookfield	10/21/74	7.0	6.8
51009	Bell Pond	Worcester	06/05/79	7.0	6.9
92063	Stiles Pond	Boxford	09/14/78	7.0	7.0
72126	Walker Pond	Waltham	07/20/78	7.0	7.4
35007	Bents Pond	Gardner	09/19/79	7.5	6.3
62218	Monponsett Pond-East	Halifax	08/03/82	8.0	5.4
36155	Thompsons Pond	Spencer	06/12/84	8.0	5.5
74025	Whitmans Pond	Weymouth	03/16/81	8.0	6.3
36171	Red Bridge Impoundment	Ludlow	04/25/77	8.0	6.5

Table 4. (Continued)

PALIS NUMBER	NAME OF LAKE	TOWN	DATE SURVEYED	ALKA-LINITY (mg/l)	pH (Standard Units)
36023	Brooks Pond	North Brookfield	08/10/83	8.0	6.6
62166	Lake Sabbatia	Taunton	08/25/80	8.0	6.6
51091	Manchaug Pond	Douglas	06/06/77	8.0	6.6
62119	Monponsett Pond-West	Halifax	08/03/82	8.0	6.7
32054	Norwich Pond	Huntington	08/09/78	8.0	6.7
84017	Frye Pond	Haverhill	07/28/83	8.0	6.8
36162	Ware Impoundment	Ware	07/15/80	8.0	6.8
36115	Graves Brook Reservoir	Palmer	07/12/84	8.0	6.9
41046	Sherman Pond	Brimfield	07/01/76	8.0	6.9
36020	Brigham Pond	Hubbardston	07/02/79	8.0	7.0
51152	Singletary Pond	Sutton	08/31/77	8.0	7.0
93014	Chebacco Lake	Hamilton	06/29/81	8.0	7.1
82011	Boons Pond	Stow	07/17/79	8.0	7.5
84002	Lake Attitash	Amesbury	03/09/78	9.0	5.8
51109	Mumford River Impound-ment	Douglas	08/16/84	9.0	5.9
82003	Ashland Reservoir	Ashland	07/02/81	9.0	6.0
36066	Hardwick Pond	Hardwick	08/04/81	9.0	6.0
36079	Lake Lashaway	North Brookfield	10/22/80	9.0	6.2
31026	Noyes Pond	Tolland	07/30/79	9.0	6.4
81007	Bare Hill Pond	Harvard	08/03/78	9.0	6.6
36040	Cranberry Meadow Pond	Charlton	06/04/84	9.0	6.6
82088	Nutting Lake-East	Billerica	11/26/74	9.0	6.0
62198	Turnpike Lake	Plainville	06/27/79	9.0	6.6
51010	Brierly Pond	Millbury	06/05/79	9.0	6.7
36032	Chicopee Falls Impound-ment	Chicopee	08/26/80	9.0	6.8
35089	Tully Pond	Orange	09/20/79	9.0	6.9
62213	Winnecunnet Pond	Norton	06/05/80	9.0	6.9
32060	Rudd Pond	Becket	06/21/78	9.0	7.0
92038	Martins Pond	North Reading	07/30/81	9.0	7.1
96004	Ashumet Pond	Mashpee	08/13/80	9.0	7.2
32079	Yokum Pond	Becket	06/21/78	9.0	7.2
21029	East Indies Pond	New Marlborough	08/23/78	9.0	7.3
34047	Lower Highland Lake	Goshen	07/12/78	9.0	7.3
36056	Eames Pond	Paxton	06/12/84	10.0	5.5
36073	Howe Pond	Spencer	06/14/84	10.0	6.0
84012	Flint Pond	Tyngsborough	04/11/77	10.0	6.6
36094	Mona Lake	Springfield	08/08/78	10.0	6.7
36083	Long Pond	Springfield	08/08/78	10.0	6.8
42058	Texas Pond	Oxford	07/29/74	10.0	6.8
35008	Bourn-Hadley Pond	Templeton	09/24/79	10.0	6.9
84033	Long Sought-for Pond	Westford	06/25/74	10.0	6.9
36166	Wickaboag Pond	West Brookfield	07/16/74	10.0	6.9
42019	Granite Reservoir	Charlton	07/30/74	10.0	7.1
95129	Sassaquin Pond	New Bedford	06/12/80	10.0	7.1
61006	South Watuppa Pond	Fall River	10/24/74	10.0	7.1
81164	Bower Springs Pond-East	Bolton	08/21/79	10.0	7.2
21005	Ashmere Lake	Hinsdale	08/16/83	10.0	***

*** Missing data

LISTING OF THREATENED AND IMPAIRED LAKES AND PONDS

AMES/LONG POND, STOUGHTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

These ponds are in the eutrophic stage. Macrophyte density in the northern and eastern basins is very high. Phytoplankton counts are low. Bacteria counts are generally low; some high values have been observed at the bathing beach. Steep slopes in area promote rapid runoff and contribute to sediment input.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, fishing and boating are impacted by macrophytes, sediment loading and high bacteria counts.

LAKE/POND CHARACTERISTICS: (Metric/English)

	North Basin	South Basin	East Basin
Maximum Depth:	1.5m/5'	2.1m/7'	1.2m/4'
Mean Depth:	0.3m/1'	0.9m/3'	0.6m/2'
Maximum Length:	792m/2,600'	625m/2,050'	274m/900'
Maximum Width:	183m/600'	134m/440'	46m/150'
Surface Area:	153,786m^2/38ac	147,716m^2/36.5ac	19,026^2/4.7ac
Volume:	69,194m^3/56.09ac.ft.	186,597m^3/151.26ac.ft	14,569m^3/11.81ac.ft.
Shoreline Length:		--	
Development of Shoreline:		--	

Major Inflows: Unnamed tributary along northern shore - Ames Pond

Major Outflows: Unnamed tributary along southern shore - Long Pond

LAKE WATERSHED:

Area: 2,798 acres

Topography: Rolling hills and adjacent wetlands

Major Soil Types: N/A

Land Use:	% of Total:
Rural residential	N/A
Open space/wooded	

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Surface runoff	None
Septic systems	None

N/A - Not available

ARCADIA LAKE, BELCHERTOWN

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

The data indicates an excessive loading of the limiting nutrient, phosphorus.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, fishing and boating. All are threatened by nuisance aquatic weeds.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3.5 m	11.5 ft.
Mean Depth:	2.5 m	8.25 ft.
Maximum Length:	482 m	1,583 ft.
Maximum Width:	343 m	1,125 ft.
Surface Area:	16 ha	40 acres
Volume:	260,044 m^3	211 acre/ft.
Shoreline Length:	1,770 m	1.1 mi.
Development of Shoreline:	2.5	

Major Inflows: Northwest Inlet

Major Outflows: Outlet flows to Metacomet Lake

LAKE WATERSHED:

Area: 915 acres

Topography: Characterized by steep slopes in upper watershed and numerous wetland areas near the pond.

Major Soil Types: Hinckley-Wethersfield-Windsor soil association

Land Use:	% of Total:
Forest	84.0
Residential	6.0
Open Land	2.0
Wetland	4.0
Lake	4.0

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	Ongoing septic system inspection and maintenance program

ASHFIELD POND, ASHFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality is apparent. This is a shallow, mesotrophic warm water pond with dense macrophytes and low hypolimnetic D.O.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impaired due to organic enrichment.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	6.1 m	20 ft
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	15.78 ha	39 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:		

Major Inflows: Groundwater
Unnamed intermittent tributary

Major Outflows: South River

LAKE WATERSHED:

Area: N/A

Topography: Steep sloped forested hills in northern, eastern and southern parts of watershed. Steep sloped hills which are not forested in western part.

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
Storm drains	None

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	None

ASHUMET POND, FALMOUTH/MASHPEE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

The pond is classified as mesotrophic.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, fishing, boating, water skiing, wind surfing. Most of the recreational activities are threatened due to (a) groundwater discharge of a septic leachate plum along the northwest shore; and (b) the periodic discharge of harzardous chemicals into the lake.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	20 m	65 ft.
Mean Depth:	7 m	23 ft.
Maximum Length:	1,356 m	4,450 ft.
Maximum Width:	991 m	3,250 ft.
Surface Area:	82 ha	203 acres
Volume:	5,915,866 m^3	4,796 acre/ft.
Shoreline Length:	3,901 m	12,800 ft.
Development of Shoreline:	1.2	

Major Inflows: Groundwater

Major Outflows: Groundwater

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Land disposal of sludge Runoff of hazardous waste	N/A

BARE HILL POND, HARVARD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Excessive nutrients (phosphorus and nitrogen) and siltation have reduced the water quality by creating conditions leading to a proliferation of aquatic plants and algae.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming is impaired by aquatic plants and algae which proliferate due to siltation and excessive nutrients. Boating is impaired by excessive aquatic weeds and pond shallowness due to siltation.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	7.3 m	24 ft.
Mean Depth:	3.0 m	10.0 ft.
Maximum Length:	2,057 m	6,750 ft.
Maximum Width:	1,158 m	3,800 ft.
Surface Area:	130 ha	321 acres
Volume:	3.9 x $10^6 m^3$	3,162 acre/ft.
Shoreline Length:	8,694 m	28,525 ft.
Development of Shoreline:	2.08	

Major Inflows: Clapp's Brook - east side of pond
Bowers Brook - enters from south end of pond
Thurston's Brook - enters from southeast end

Major Outflows: Bowers Brook flows out from north end

LAKE WATERSHED:

Area: 10.82 km^2 or 4.18 $mile^2$

Topography:

Glaciated Terrain, predominately gently rolling hills with a scattering of drumlins.

Major Soil Types:

Chatfield, Hollis, Rock outcrop - well drained
Paxton, Woodbridge - moderately to well drained soils

Land Use:	% of Total:
Commercial	0.9
Open space	8.3
Forest	63.0
Wetland	8.4
Residential	14.7
Agricultural	4.6

POINT SOURCES:

Source	Controls in Place
No known point sources	N/A

NONPOINT SOURCES:

Source	Controls in Place
Agriculture (nonirrigated crop production)	None
Land disposal (onsite wastewater systems)	None
Atmospheric deposition	None

BARTLETT POND, NORTHBOROUGH

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality is apparent due to phosphorus input from the main inlet and from septic systems.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming is limited by weeds and transparency, while boating and fishing is limited by extensive weed growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3.0 m	10 ft.
Mean Depth:	1.4 m	4.6 ft.
Maximum Length:	700 m	2,300 ft.
Maximum Width:	471 m	1,500 ft.
Surface Area:	18 ha	44 acres
Volume:	2.47 x $10^5 m^3$	202 acre/ft.
Shoreline Length:	3,500 m	11,500 ft.
Development of Shoreline:	2.33	

Major Inflows: Stream inlet from Little Chauncy Pond
Wetland discharging into pond near Lyman Street

Major Outflows: Stream outflow located next to Bartlett Street

LAKE WATERSHED:

Area: 684 ha, 1690 acres

Topography:

Pond was created by flooding meadows adjacent to Stirrup Brook, located within a preglacial valley with major uplands to the east and west that are underlain with bedrock.

Major Soil Types:

Hinckley, Merrimac, Windsor, Agawam, Canton, Enfield, Ninigret, Occum, Pootatuck, and Paxton.

Land Use:	% of Total:
Forest	28.0
Open	26.0
Residential	16.0
Institutional/Commercial	15.0
Water	15.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Wetland drainage from Lyman Street	None
Watershed drainage and septic systems	None

BARTLETT POND, PLYMOUTH

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is poor. High nutrient levels and high siltation rates have contributed to dense macrophyte growths.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are all moderately impaired by dense weed growths and shallow depths.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1 m	3.3 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	13 ha	32 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	--

Major Inflows: Inlet located on southeast side

Major Outflows: Outlet located on western side

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Agricultural fertilizers	None
Cranberry bogs	None
Septic systems	None
Residential	None

BEARSE POND, BARNSTABLE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is characterized by low alkalinity, pH values between 6 and 7 and high chloride concentrations.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	5 m	16 ft.
Mean Depth:	2.7 m	8.9 ft.
Maximum Length:	914 m	3,000 ft.
Maximum Width:	427 m	1,400 ft.
Surface Area:	160 ha	65 acres
Volume:	714,936 m^3	579.6 acre/ft.
Shoreline Length:	2,438 m	8,000 ft.
Development of Shoreline:	1.3	

Major Inflows: Groundwater

Major Outflows: Outlet flows to Wequaquet Lake

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: Plymouth, Merrimac, Hinckley

Land Use:	% of Total:
Residential	N/A
Forest	

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Septic systems Cranberry bogs Road runoff Acid rain	Diagnostic/Feasibility Study presently underway

BIG ALUM LAKE, STURBRIDGE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Nuisance algal blooms have increased in frequency from one to two per summer to three or four per summer. Primary phosphorus sources are wastewater disposal and internal loading due to anoxic hypolimnion. The lake is currently in the mesotrophic stage.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Aesthetics, swimming and boating are all impacted by nuisance algal blooms.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	12.2 m	40 ft.
Mean Depth:	4.9 m	16 ft.
Maximum Length:	1,524 m	5,000 ft.
Maximum Width:	701 m	2,300 ft.
Surface Area:	804,180 m^2	1985 acres
Volume:	5.0 x 10^6 m^3	4,053 acre/ft.
Shoreline Length:	--	--
Development of Shoreline:	--	--

Major Inflows: One unnamed inlet drains a wetland to the north

Major Outflows: Outlet flows southwest to Brimfield Reservoir

LAKE WATERSHED:

Area: 507 acres

Topography: Hilly, steep sloping terrain

Major Soil Types: Hollis, Brookfield, Charlton, Whitman, Woodbridge and Paxton

Land Use:	% of Total:
Forest	63.0
Marsh	8.0
Agriculture	2.0
Urban/residential	27.0

*Does not include surface of Big Alum Lake

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Wastewater	Dam improvements and hypolimnetic withdrawal to be implemented
Surface runoff	

BILLINGTON SEA, PLYMOUTH

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is poor. High nutrient levels and shallow depths have contributed to algal blooms and very dense macrophyte growths.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming is severely impaired by algal blooms.
Boating and fishing are impaired by dense macrophyte growths.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3.35 m	11 ft.
Mean Depth:	1.7 m	5.5 ft.
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	109 ha	269 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	--

Major Inflows: Seepage Lake

Major Outflows: Outlet located in the northeast section of pond and flows north

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Agricultural fertilizers (cranberry bogs)	None
Residential septic systems	None

BLACK'S NOOK POND, CAMBRIDGE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Black's Nook is a small (2.5 acre), shallow, densely vegetated, detritus filled, eutrophic urban pond. Eighty-two percent of phosphorus load to the pond is derived from bottom sediments, which have reduced maximum depth from about 30 feet to about 7 feet.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Passive recreation only. The pond is also a study site for natural history courses.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	2.1 m	6.9 ft.
Mean Depth:	1.5 m	4.9 ft.
Maximum Length:	125 m	410 ft.
Maximum Width:	110 m	360 ft.
Surface Area:	1.01×10^4 m^2	2.5 acres
Volume:	1.51×10^4 m^3	12 acre/ft.
Shoreline Length:	340 m	1,115 ft.
Development of Shoreline:	1.38	

Major Inflows: No inflowing tributaries; but intermittent flow from clay pipe draining golf course backflows into pond through the outlet.

Major Outflows: None. Outflow is intermittent.

LAKE WATERSHED:

Area: 24 acres/9.71×10^4 m^2

Topography: Flat (5th fairway and green of municipal golf course).

Major Soil Types: Unconsolidated glacial deposits including sand, gravel and till.

Land Use:	% of Total:
Golf course	100.0

POINT SOURCES:

Source	Controls in Place
Clay pipe draining golf course	None

NONPOINT SOURCES:

Source	Controls in Place
Golf course runoff	None

LAKE BOON, HUDSON AND STOW

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

This is a shallow, soft water mesotrophic to eutrophic pond. Water transparency is near state limit for swimming. Phytoplankton levels are moderate. Coliforms are high at times. Aquatic macrophytes are dense in certain areas.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming is threatened by low transparency. Fishing is impacted by low hypolimnetic D.O. and organic enrichment. Boating is threatened because of organic enrichment.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	7 m	23 ft.
Mean Depth:	3.3 m	10.7 ft.
Maximum Length:	3,140 m	10,300 ft.
Maximum Width:	560 m	1,840 ft.
Surface Area:	66 ha	163 acres
Volume:	2,110,000 m^3	1,725 acre/ft.
Shoreline Length:	9.53 m	31,300 ft.
Development of Shoreline:	3.3	

Major Inflows: Groundwater and a few small unnamed tributaries.

Major Outflows: Outlet of pond flows to Assabet River.

LAKE WATERSHED:

Area: 583 ha/1,440 acres

Topography: Mostly forested, low rolling sandy hills, and red maple swamps

Major Soil Types: Hinckley and Windsor

Land Use:	% of Total:
Forest	63.0
Residential	18.0
Industrial	3.0
Wetlands	2.0
Open land	1.0
Water	13.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	None

LAKE BRAY, MT. TOM RESERVATION, HOLYOKE/EASTHAMPTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is moderate; severe macrophyte and algal growth.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing is the main recreational value. Impairment is due to weed growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	2 m	6.8 ft.
Mean Depth:	--	--
Maximum Length:	360 m	1,200 ft.
Maximum Width:	200 m	670 ft.
Surface Area:	5 ha	12 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	--

Major Inflows: Tributary (unnamed) entering from the north
Tributary (unnamed) entering from the south

Major Outflows: Outflow through a standing pipe along the northeastern bounder of the pond.

LAKE WATERSHED:

Area: N/A

Topography: Lake Bray lies on top of the Mt. Tom range and the area is heavily forested.

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Possibly watershed runoff	None

BROWN'S POND, PEABODY

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

The pond has been classified as mesotrophic.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, fishing and boating are the main recreational uses.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	8.2 m	27 ft.
Mean Depth:	3.3 m	10.8 ft.
Maximum Length:	612 m	2×10^3 ft.
Maximum Width:	--	--
Surface Area:	1.01×10^4 m^2	25 acres
Volume:	3.32×10^5 m^3	269 acre/ft.
Shoreline Length:	415 m	5,270 ft.
Development of Shoreline:	1.42	

Major Inflows: Single tributary at north end of pond

Major Outflows: Single outlet at north end of pond

LAKE WATERSHED:

Area: 384 acres

Topography: N/A

Major Soil Types: Muck, Hollis Complex, Walpole soils, Woodbridge, Merrimac, Udorthents

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
6 storm sewers	None

NONPOINT SOURCES:

Source	Controls in Place
Surface urban runoff	N/A

BULLOUGH'S POND, NEWTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

This pond is classified as hypereutrophic based on high phosphorus and chlorophyll a concentrations.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Skating is imparied by channelization and rapid flushing. Passive recreation is impaired by weeds and algae.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	122 m	4.0 ft.
Mean Depth:	0.7 m	2.2 ft.
Maximum Length:	318 m	1,045 ft.
Maximum Width:	107 m	342 ft.
Surface Area:	1.9 ha	4.7 acres
Volume:	12,950 m^3	10.5 acre/ft.
Shoreline Length:	570 m	1,870 ft.
Development of Shoreline:	1.17	

Major Inflows: Hammond Brook
Cold Spring Brook

Major Outflows: Stream to Charles River

LAKE WATERSHED:

Area: 155 ha/345 ac

Topography: Low hills

Major Soil Types: Merrimac Urban Complex
Haven Urban Land Complex

Land Use:	% of Total:
Residential/Urban	66.0
Cemetery	20.0
Municipal	8.0
Open	3.0
School	3.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Storm sewers	None
Surface runoff	None
Highway maintenance and runoff	None

LAKE BUEL, MONTEREY/NEW MARLBOROUGH

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Lake Buel is eutrophic, as indicated by the excessive loading of nutrients and the dense growth of macrophytes, especially eurasian milfoil.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating, canoeing, sailing, water skiing, fishing,and camping. Most of these activities are impaired due to the extensive and dense growth of eurasian milfoil. Lake is subject to excessive loading of nutrients.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	14.0 m	46 ft.
Mean Depth:	5.2 m	17 ft.
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	7.85×10^5 m^2	194 acres
Volume:	4.05×10^6 m^3	3,310 acre/ft.
Shoreline Length:	5,304 m	17.4×10^3 ft.
Development of Shoreline:	1.7	

Major Inflows: Konkapot River
Tributary from Stevens Pond

Major Outflows: Single outlet at southeast corner of lake flows to Konkapot River via a wetland.

LAKE WATERSHED:

Area: 2,767 acres (11.2×10^6 m^2)

Topography: N/A

Major Soil Types: Sandy and gravelly, mineral, bedrock, and stony soils that range from excessively drained to poorly drained.

Land Use:	% of Total:
Forest	83.0
Agriculture/open space	10.0
Residential	6.0
Wetland	1.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Forest runoff	None
Agricultural runoff	None
Urban runoff	None
On-site septic systems	None

BUTTONWOOD POND, NEW BEDFORD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Pond is used as a flood control structure. After storms, poor quality urban runoff flushes the pond. Subsequently, this leads to oxygen depletion at the pond bottom and high concentrations of ammonia and phosphorus. If stable, periods of high production by algae follow. The overall pattern is one of discontinuous stress folllowed by periods of recovery.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, paddle boating and passive recreational activities have been adversely affected by urban runoff (storm sewers). Essentially, the pond serves as a settling basin for urban runoff; hence, volume has decreased, shoreline encroachment is evident, and the water is turbid and hypereutrophic.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.3 m	4.25 ft.
Mean Depth:	1.1 m	3.7 ft.
Maximum Length:	0.3 km	980 ft.
Maximum Width:	0.2 km	650 ft.
Surface Area:	0.039 km^2	9.6 acres
Volume:	4.37 x 10^4 m^3	35 acre/ft.
Shoreline Length:	0.82 km	2,690 ft.
Development of Shoreline:	1.17	

Major Inflows: Buttonwood Brook
Tile drain

Major Outflows: Outlet on Fuller Avenue

LAKE WATERSHED:

Area: 2.06 km^2 (0.8 $mi.^2$)

Topography: Flat-urban residential

Major Soil Types: N/A

Land Use:	% of Total:
Urban residential	34.0
Forested	22.0
Open areas	14.0
Recreational	7.0
Transportation	7.0
Industrial	2.0
Marsh/wetlands	2.0
Institutional	1.0
Commercial	0.5
Agricultural	0.5

POINT SOURCES:

Source	Controls in Place
36" storm sewer	None

NONPOINT SOURCES:

Source	Controls in Place
Urban storm sewers and surface runoff	None

CEDAR POND, STURBRIDGE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

The trophic state indicates a productive and nutrient rich system. Nutrient values in the water column are in a range indicative of a mesotrophic lake while chlorophyll a values are in a range indicative of a mesotrophic to eutrophic lake.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Boating, swimming and fishing are the recreational uses. Some areas of the pond impaired by aquatic weed growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	4.9 m	16 ft.
Mean Depth:	1.4 m	4.6 ft.
Maximum Length:	2,500 m	8,200 ft.
Maximum Width:	500 m	1,640 ft.
Surface Area:	62 ha	153 acres
Volume:	916,186 m^3	741 acre/ft.
Shoreline Length:	7,200 m	23,616 ft.
Development of Shoreline:	2.5	

Major Inflows: North inlet stream
East inlet stream

Major Outflows: Outlet at southern end of pond

LAKE WATERSHED:

Area: 9,040,000 m^2 (2,234 acres)

Topography: Very hilly with many steep slopes

Major Soil Types: Paxton, Canton, Hollis, and Merrimac

Land Use:	% of Total:
Forest	69.0
Residential	8.0
Open water	8.0
Wetlands	6.0
Open Areas	4.0
Intensive agriculture	3.0
Mining	2.0

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	Anticipated septic system management program
Construction areas Road runoff Erosion	Best management practices

CEDAR SWAMP POND, MILFORD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality is apparent. Dense vegetative growth is present caused by very shallow water, organic rich substrate and phosphorus loading from the developed watershed.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Boating and fishing are moderately impaired due to pronounced weed growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.9 m	6.2 ft.
Mean Depth:	0.4 m	1.3 ft.
Maximum Length:	1,385 m	4,500 ft.
Maximum Width:	615 m	2,000 ft.
Surface Area:	42.2 ha	104 acres
Volume:	198,500 m^3	162 acre/ft.
Shoreline Length:	--	--
Development of Shoreline:	--	--

Major Inflows: Charles River, located at northern end of pond

Major Outflows: Charles River, located at southern end of pond

LAKE WATERSHED:

Area: 2,050 ha/5,066 acres

Topography: Hilly with wetland areas.

Major Soil Types: Canton, Hinckley, Scituate, Montauk, Chatfield-Hollis

Land Use:	% of Total:
Forest	65.0
Open	9.0
Residential	23.0
Industrial	<1.0
Cedar Swamp Pond	2.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Stormflow/watershed runoff	Presently none Diagnostic/Feasibility Study recommended dredging and diversion

CHANDLER POND, BOSTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Chandler Pond is eutrophic. In-lake and tributary nutrient levels and bacteria counts are quite high. Phytoplankton counts are also very high. Macrophytes are dense.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Aesthetics, boating and fishing are impaired by phytoplankton blooms and dense macrophytes.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.5 m	5.0 ft.
Mean Depth:	--	--
Maximum Length:	293 m	960 ft.
Maximum Width:	210 m	690 ft.
Surface Area:	44,517 m^2	11 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	--

Major Inflows: Two unnamed inlets on the northwest and southwest shore.

Major Outflows: One outlet on eastern shore.

LAKE WATERSHED:

Area: N/A

Topography: Rolling hills

Major Soil Types: N/A

Land Use:	% of Total:
Primary residential	N/A
Recreational	N/A

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Surface runoff	None
Storm sewers	None

CHAUNCY LAKE, WESTBOROUGH

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality is present due to weed and algal growth which is a result of excessive nutrient influx from groundwater and surface runoff.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are moderately impaired due to nutrients.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	6.1 m	20.0 ft.
Mean Depth:	3.6 m	11.9 ft.
Maximum Length:	1,113 m	3,650 ft.
Maximum Width:	975 m	3,220 ft.
Surface Area:	70.8 ha	175 acres
Volume:	2,569,000 m^3	2,082.5 acre/ft.
Shoreline Length:	3,950 m	12,960 ft.
Development of Shoreline:	1.32	

Major Inflows: Two 24-inch concrete pipes near Chauncy Circle
One 36-inch steel pipe near fisherman's access road
One 24-inch concrete pipe by the State Hospital wetlands

Major Outflows: Culvert near the Westborough State Hospital

LAKE WATERSHED:

Area: 4.43 km^2/1.71 mi^2

Topography: Entire lake watershed is located within a depression created during deglaciation.

Major Soil Types: N/A

Land Use:	% of Total:
Water/Wetland	29.35
Residential	12.49
Commerical	12.76
Industrial	1.82
Forested	15.68
Open space	27.44

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Wetlands	Presently none; anticipated nutrient uptake pond
Surface runoff	Presently none; anticipated nutrient uptake pond
State Hospital septic system	Presently none; anticipated filter berm

CHEBACCO LAKE, ESSEX/HAMILTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Septic systems contribute 65% of the total phosphorus load to the lake. In addition, an introduced aquatic weed, Fanwort, dominates the macrophyte population and has become a major nuisance in the lake.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, boating and swimming are impaired by dense macrophyte growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	7.6 m	25 ft.
Mean Depth:	3.98 m	13.1 ft.
Maximum Length:	1,574.5 m	5,166.6 ft.
Maximum Width:	670.5 m	2,200 ft.
Surface Area:	85 ha	209 acres
Volume:	2.67×10^6 m^3	2,164 acre/ft.
Shoreline Length:	6,765.9 m	22,198 ft.
Development of Shoreline:	2.7	

Major Inflows: Unnamed brook flows from Round Pond
Wetland draining Becks Pond
Wetland - maple swamp
Intermittent streams

Major Outflows: Alewife Brook flows into Essex River

LAKE WATERSHED:

Area: 3,657 acres

Topography: Very flat, swampy watershed rimmed by highlands.

Major Soil Types: Chatfield, Hollis, rock outcrop complex "Freetown muck" - swampland

Land Use:	% of Total:
Forest	57.8
Wetland	17.6
Residential	10.4
Open and public	1.2
Cropland/pasture	1.4

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	None, some dye tests conducted in 1987. Lake Association promoting use of low phosphate fertilizers and increased frequency of pumping septic tanks.

CHESHIRE LAKE, CHESHIRE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

This lake is eutrophic due to excessive nutrients, shallow morphometry, suitable substrate, and abundant aquatic macrophytes.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, boating, and swimming are all threatened from nutrient enrichment/aquatic macrophytes.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3.0 m	10 ft.
Mean Depth:	2.3 m	7 ft.
Maximum Length:	2.3 km	7,544 ft.
Maximum Width:	0.7 km	2,296 ft.
Surface Area:	1.1 km^2	271.8 acres
Volume:	2,561,715 m^3	2,076.8 acre/ft.
Shoreline Length:	6.1 km	3.8 miles
Development of Shoreline:	1.64	

Major Inflows: Hoosic River (South Branch)

Major Outflows: Hoosic River (South Branch)

LAKE WATERSHED:

Area: 39 km^2

Topography: Steep glaciated mountains separated by low-lying wetlands

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Agriculture	N/A
Silviculture	N/A

LAKE COCHITUATE, FRAMINGHAM/NATICK

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Classified as meso-eutrophic. A moderate nutrient load from tributaries leads to algal problems.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimmiing, fishing and boating are increasingly threatened from nutrient input/algal blooms.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	18.3 m	60 ft.
Mean Depth:	6.7 m	22.0 ft.
Maximum Length:	1,789 m	5,868 ft.
Maximum Width:	973 m	3,189 ft.
Surface Area:	2,310,751 m^3	571 acres
Volume:	17,015857 m^3	13,795 acre/ft.
Shoreline Length:	21,082 m	13.1 miles
Development of Shoreline:	2.0	

Major Inflows: Beaver Dam Brook
Course Brook
Pegan Brook
Snake Brook

Major Outflows: Unnamed surface outlet

LAKE WATERSHED:

Area: 10,726 acres

Topography: Glacial deposits

Major Soil Types:

Glacial and glacial lake soils predominantly sands and tills

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Urban	Filter dike on Beaverdam Brook/ Course Brook inlet Stormwater detention on Pegan Brook

CONGAMOND LAKES, SOUTHWICK

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Classified as eutrophic due to moderate nutrient loading.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, swimming and boating are threatened from cultural eutrophication in the watershed.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	12.5 m	41.0 ft.
Mean Depth:	7.9 m	25.9 ft.
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	188.2 ha	465 acres
Volume:	1.05×10^7 m^3	8,512 acre/ft.
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Great Brook
Groundwater

Major Outflows: Groundwater

LAKE WATERSHED:

Area: 930 ha/2,296 acres

Topography: Glacial with conspicuous glacial deposits

Major Soil Types: N/A

Land Use:	% of Total:
Developed	83.0
Wetlands/forest/open	9.0
Commercial	8.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Urban runoff	None
Internal loading	

DIMMOCK POND, SPRINGFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality is apparent. This is a shallow mesotrophic, unstratified, small pond with high phosphorus and suspended solids loadings. Dense vegetation is present around perimeter. Transparency is low and water is highly colored.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Organic enrichment

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3 m	10 ft.
Mean Depth:	1.9 m	6.2 ft.
Maximum Length:	304.8 m	1,000 ft.
Maximum Width:	228.6 m	750 ft.
Surface Area:	4.45 ha	11 acres
Volume:	83,880.1 m^3	68 acre/ft.
Shoreline Length:	841.3 m	2,760 ft.
Development of Shoreline:	1.1	

Major Inflows: Urban runoff and groundwater

Major Outflows: Groundwater

LAKE WATERSHED:

Area: 36 ha/89 acres

Topography: Low relief urbanized area. Limited drainage area.

Major Soil Types: N/A

Land Use:	% of Total:
Urbanized open space	71.0
Residential	22.0
Industrial	7.0

POINT SOURCES:

Source	Controls in Place
Gully on southern shoreline filled with street sweepings which are eroding into pond.	None

NONPOINT SOURCES:

Source	Controls in Place
Urban runoff	None

DOROTHY POND, MILLBURY

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Excessive phosphate levels in the pond are causing blue-green algal blooms which reduces water transparency and dissolved oxygen concentrations.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming is impaired by aquatic weeds and algal caused by excessive nutrients and siltation. Boating is impaired due to excessive weeds.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	6 m	19.7 ft.
Mean Depth:	2.36 m	7.75 ft.
Maximum Length:	1,554.5 m	5,100 ft.
Maximum Width:	944.9 m	3,100 ft.
Surface Area:	590,052.6 m^2	145.8 acres
Volume:	1.39 x 10^6 m^3	1,127 acre/ft.
Shoreline Length:	7,632.2 m	25,040 ft.
Development of Shoreline:	1.29	

Major Inflows: Broad Meadow Brook enters the northern cove of Dorothy Pond

Major Outflows: The major outflow is the dam spillway at the southwest end of the lake.

LAKE WATERSHED:

Area: 10.55 x 10^6 m^2/2,607.8 acres

Topography: The topoography is irregular, typical of glaciated areas.

Major Soil Types: Canton - Till or Stratified Drift
Chatfield - Hollis - Rock Outcrop - Till/Bedrock

Land Use:	% of Total:
Rural residential	3.4
Suburban residential	11.7
Urban	21.6
Open space	13.1
Forest	41.8
Industrial	2.0
Open water	5.6
Gravel pit	0.3
Landfill	0.5

POINT SOURCES:

Source	Controls in Place
No known point sources	--

NONPOINT SOURCES:

Source	Controls in Place
Surface runoff	None
Landfill	None
Onsite wastewater systems	None
Atmospheric deposition	None
Highway runoff	None

DUDLEY POND, WAYLAND

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Moderate nutrient levels; low dissolved oxygen in hypolimnion (summer), blue-green blooms, very dense macrophytes cover over about 2/3 of the pond.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing impaired by blue-green algal blooms and very dense submerged vegetation due to nutrients.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	8.4 m	27.5 ft.
Mean Depth:	2.8 m	9.2 ft.
Maximum Length:	1,146 m	3,760 ft.
Maximum Width:	512 m	1,680 ft.
Surface Area:	36.7 ha	90.8 acres
Volume:	1.034×10^6 m^3	838 acre/ft.
Shoreline Length:	4,346 m	14,260 ft.
Development of Shoreline:	2.02	

Major Inflows: Direct surface runoff via stormdrains
Groundwater

Major Outflows: Unnamed stream to the Sudbury River
Groundwater

LAKE WATERSHED:

Area: 1.36 km^2 336.1 acres

Topography: Small watershed with steep topography around most of the pond.

Major Soil Types: Hinckley, Merrimac, Enfield, Walpole

Land Use:	% of Total:
Residential	48.0
Forest, open space, wetlands	25.0
Dudley Pond	27.0

POINT SOURCES:

Source	Controls in Place
Storm sewers	About half of system has been redesigned to use leach pits instead of catch basins.

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	None

DUNN POND, GARDNER

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

The data indicates an oligotrophic pond with low nutrient levels.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, swimming and boating are threatened due to ongoing development in the watershed.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	7.01 m	23 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	7.28 ha	18 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Two surface inlets
Groundwater

Major Outflows: Surface outlet

LAKE WATERSHED:

Area: N/A

Topography: Rolling hills separated by low-lying wetlands

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Urban runoff from stormdrains	Filter dike to control solids and nutrients assciated with solids.

EAGLE LAKE, HOLDEN

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

The reduced flushing rate, low water volume, moderate to high nutrient levels, and dense growth of macrohytes all indicate the eutrophic status of Eagle Lake.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are the primary recreational uses of the lake. All three activities, especially fishing, have been impaired due to flow alteration in the watershed, and the poor condition of the dam. Water level fluctuations are severe.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3.4 m	11 ft.
Mean Depth:	0.7 m	24 ft.
Maximum Length:	884 m	2.9×10^3 ft.
Maximum Width:	488 m	1.6×10^3 ft.
Surface Area:	3.4×10^5 m^2	84 acres
Volume:	2.47×10^5 m^3	200 acre/ft.
Shoreline Length:	3.83×10^3 m	12.57×10^3 ft.
Development of Shoreline:	1.85	

Major Inflows: Construction of water supply reservoirs in the watershed has substantially reduced flow to Eagle Lake.

Major Outflows: Single outflow forms Asnebumskit Brook

LAKE WATERSHED:

Area: 26.44×10^6 m^2 (16 square miles)

Topography: High hills (to 1,300 ft.) with moderate gradients and low-lying wetlands.

Major Soil Types: Merrimac, Charlton, Windsor, Sutton, Leicester, Ridgebury, Whitman, Woodbridge, Paxton, Hollis, Hinckley, Agawam, Scarboro and Rumney series, plus muck and peat.

Land Use:	% of Total:
Forest	47.0
Farmland	21.0
Urban	8.0
Open water	24.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Watershed runoff	None

EAST LAKE WAUSHACUM, STERLING

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Characterized by moderate nutrient levels, hypolimnetic anoxia (summer), and moderately low alkalinity.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating, aesthetics and fishing. Swimming and boating impaired by algal mats and vegetation. Fishing may be affected by vulnerability to acid deposition.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	11.6 m	38 ft.
Mean Depth:	4.0 m	13 ft.
Maximum Length:	1,300 m	4,250 ft.
Maximum Width:	1,160 m	3,800 ft.
Surface Area:	74.3 ha	184 acres
Volume:	2.96×10^6 m^3	2,400 acre/ft.
Shoreline Length:	4,800 m	15,700 ft.
Development of Shoreline:	1.57	

Major Inflows: Tributaries (6 unnamed)
Surface runoff

Major Outflows: Unnamed outlet to South Meadow Brook
Unnamed outlet to West Waushacum Pond

LAKE WATERSHED:

Area: N/A

Topography: Very hilly in the northern watershed; more gradually sloping in the south.

Major Soil Types: Fine sand loam underlain by hardpan - Woodbridge, Paxton

Land Use:	% of Total:
Forest	68.4
Agriculture/open	17.0
Urban (residential)	14.0
Recreation	0.5

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
On-site wastewater systems	Public awareness program

EDGARTOWN GREAT POND, EDGARTOWN

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

High coliform counts possibly due to avian coliform contributions.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Shellfishing, swimming and boating. Shellfishing and swimming impaired by high coliform counts.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	N/A	
Mean Depth:	N/A	
Maximum Length:	N/A	
Maximum Width:	N/A	
Surface Area:	368.7 ha	911 acres
Volume:	N/A	
Shoreline Length:	N/A	
Development of Shoreline:	N/A	

Major Inflows: Groundwater

Major Outflows: Inlet/outlet to ocean (tidal) on south side

LAKE WATERSHED:

Area: N/A

Topography: Gently rolling and flat terrain

Major Soil Types: Sand, gravel

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Birds Possibly a few septic systems	N/A

ELL POND, MELROSE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is poor due to high levels of the nutrients, nitrogen and phosphorus. Contamination by total and fecal coliform bacteria as well as oil and grease is also a problem. Sediment inputs indicated by settleable and suspended solids are extensive.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Limited fishing due to high levels of algae and macrophytes.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3.9 m	12.8 ft.
Mean Depth:	1.7 m	5.6 ft.
Maximum Length:	524 m	1,720 ft.
Maximum Width:	320 m	1,050 ft.
Surface Area:	90,649 m^2	975,744 $ft.^2$
Volume:	153,557 m^3	124 acre/ft.
Shoreline Length:	138 m	4,528 ft.
Development of Shoreline:	1.28	

Major Inflows: Southwest inlet
Northwest inlet
Northeast inlet

Major Outflows: Ell Pond Brook

LAKE WATERSHED:

Area: 1,100 acres

Topography: Area around pond is flat terrain. Former wetlands have been filled in. The pond occupies a central depression bordered by a discontinuous rim of rocky highlands.

Major Soil Types: Merrimack gravelly sandy loam, Gloucester fine sandy loam. Rough stony land, Merrimac gravelly loam, Gloucester stony fine sandy loam, muck and peat.

Land Use:	% of Total:
Industrial	0.4
Commercial	4.0
Residential	70.2
Open and public	3.6
Forest	18.2
Open	0.5
Wetland	0.4
Recreation	2.7

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Urban runoff through storm sewers	A detailed storm sewer evaluation survey is in progress.

LAKE ELLIS, ATHOL

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

This is a shallow, mesotrophic warm water pond with dense macrophyte growth.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing impaired due to organic enrichment.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3.3 m	10.8 ft.
Mean Depth:	1.2 m	3.9 ft.
Maximum Length:	0.94 km	0.58 mi.
Maximum Width:	--	--
Surface Area:	27.8 ha	68.9 acres
Volume:	3.32 x 10^5 m^3	269.6 acre/ft.
Shoreline Length:	3.81 km	2.37 mi.
Development of Shoreline:	2.03	

Major Inflows: Mill Brook - southern cove drain, northern cove drain.

Major Outflows: Unnamed outlet through a marsh to Millers River

LAKE WATERSHED:

Area: 721.4 ha/1,783 acres

Topography: Many large forested hills and a number of upstream reservoirs. Large wetland on southern shore.

Major Soil Types: Unknown

Land Use:	% of Total:
Forest	79.5
Residential	9.9
Lakes (w/o Lake Ellis)	3.9
Open	2.6
Agriculture	1.8
Institutional	1.1
Marsh/wetland	0.8
Commercial	0.3
Recreations/park	0.2

POINT SOURCES:

Source	Controls in Place
Storm drains	None

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	None
Highway runoff	None

FAWN LAKE, BEDFORD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is poor based on elevated phosphorus levels and low dissolved oxygen levels. Algae blooms are common and macrophyte densities are high throughout the pond.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Boating and fishing are both severely impaired by dense macrophyte growths. Siltation further impairs boating.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.6 m	5.3 ft.
Mean Depth:	0.74 m	2.4 ft.
Maximum Length:	349 m	1,145 ft.
Maximum Width:	205 m	672.6 ft.
Surface Area:	4.6 ha	11.5 acres
Volume:	34,100 m^3	27.6 acre/ft.
Shoreline Length:	1,027 m	3,369 ft.
Development of Shoreline:	1.35	

Major Inflows: Tributary at northwest end
Tributary at northeast end

Major Outflows: Outlet at southeast end

LAKE WATERSHED:

Area: 27.3 ha/67.5 acres

Topography: Moderately sloping hilly terrain in northern part of watershed. Southern part gently sloping fairly flat terrain.

Major Soil Types: Woodbridge - stony, fine, sandy loam, moderately well drained.
Paxton - stony fine sandy loam
Chatfield - Hollis - rock outcrop

Land Use:	% of Total:
Forest	61.0
Fields	21.0
Residences	13.0
Wetlands	5.0

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	None
Lawn fertilizer	None
Surface runoff from roads	None

FIVE MILE POND, SPRINGFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is good. Pond is oligotrophic with low levels of nutrients.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming is threatened by storm water inputs of road runoff.
Boating and fishing are threatened by low hypolimnetic D.O.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	10.7 m	35 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	14.6 ha	36 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Groundwater

Major Outflows: Groundwater

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
Storm drain	None

NONPOINT SOURCES:

Source	Controls in Place
Surface runoff	None
Groundwater	None

FLAX POND, LYNN

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

This pond is classified as eutrophic/mesotrophic as a result of high nutrient loading and stormwater runoff.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, boating and swimming are impaired as a result of algal blooms and bacteria levels resulting from nutrient loading and stormwater.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	8.5 m	27 ft.
Mean Depth:	4.8 m	16 ft.
Maximum Length:	902 m	2,960 ft.
Maximum Width:	444 m	1,455 ft.
Surface Area:	19.8 ha	48.9 acres
Volume:	957,541 m^3	776.8 acre/ft.
Shoreline Length:	2,972 m	9,751 ft.
Development of Shoreline:	1.88	

Major Inflows: Unnamed surface streams

Major Outflows: Unnamed surface streams

LAKE WATERSHED:

Area: 40.03 acres

Topography: Low hills and wetland areas

Major Soil Types: Hinckley, Merrimac, Canton, Paxton and Hollis

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
Urban runoff (storm drains)	N/A

NONPOINT SOURCES:

Source	Controls in Place
Urban runoff (overland)	N/A

FLINT POND, SHREWSBURY/GRAFTON/WORCESTER

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

This pond borders on meso-eutrophic conditions based on high nutrient levels and dense macrophyte growths.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing. Impaired by dense aquatic macrophyte growths.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	4.5 m	15 ft.
Mean Depth:	2.7 m	9 ft.
Maximum Length:	1,493 m	4,900 ft.
Maximum Width:	884 m	2,900 ft.
Surface Area:	102 ha	254 acres
Volume	2.8×10^6 m^3	2,325 acre/ft.
Shoreline Length:	112,776 m	37,000 ft.
Development of Shoreline:	3.1	

Major Inflows: South Meadow Brook
Bonnie Brook
Inflow from Lake Quinsigamond

Major Outflows: Quinsigamond River

LAKE WATERSHED:

Area: 3.36 sq. miles

Topography: Hilly

Major Soil Types: Paxton, Hollis, Canton

Land Use:	% of Total:
Residential	34.0
Commercial	6.0
Industrial	2.0
Park/Forest	35.0
Open	8.0
Water	15.0

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	--
Urban runoff	
Surface runoff	

FLOATING BRIDGE POND, LYNN

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Eutrophic due to excessive nutrients and shallow morphometry.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, boating and swimming are impaired due to algal blooms and macrophyte growth as a result of the excessive nutrients and shallow morphometry.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3 m	9.8 ft.
Mean Depth:	2.2 m	7.2 ft.
Maximum Length:	381 m	1,250 ft.
Maximum Width:	105 m	344.5 ft.
Surface Area:	4.1 ha	10.13 acres
Volume:	89,300 m^3	72.4 acre/ft.
Shoreline Length:	964 m	3,163 ft.
Development of Shoreline:	1.34	

Major Inflows: Groundwater
Unnamed inlet/storm drain

Major Outflows: Unnamed stream

LAKE WATERSHED:

Area: 117 hectares

Topography: Low hills and wetlands

Major Soil Types: Chatfield - Whales - rock outcrop
Paxton
Hollis

Land Use:	% of Total:
Residential	64.0
Forest	39.0
Water	6.0
Open land	1.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Urban runoff	Redirection of flow and input of "dilution" water are planned along with a new outlet.

FOREST LAKE, METHUEN

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality due to septic system inputs and storm water drainage producing high nutrient levels, low transparency and anoxia in bottom waters.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are all threatened due to organic enrichment.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	8.5 m	28 ft.
Mean Depth:	3.1 m	10 ft.
Maximum Length:	762 m	2,500 ft.
Maximum Width:	412.7 m	1,354 ft.
Surface Area:	19.4 ha	48 acres
Volume:	0.59 million m^3	478 acre/ft.
Shoreline Length:	1,650.8 m	5,416 ft.
Development of Shoreline:	N/A	

Major Inflows: Groundwater and Harris Brook

Major Outflows: Harris Brook

LAKE WATERSHED:

Area: 103.6 ha/256 acres

Topography: Irregular, characterized by small hills and valleys which exhibit the morphologies of glacially sculptured areas.

Major Soil Types: Canton, Montauk, Ridgebury and Leicester

Land Use:	% of Total:
Forest	63.0
Agricultural	1.4
Open space	1.8
Residential	11.9
Wetland	3.2
Open Water	18.7

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	None

FORGE POND, GRANBY

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Very poor water quality. This is an unstratified, shallow, warm water, hypereutrophic pond with periodic blue-green algal blooms and high phosphorus content.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fish, swimming and boating are threatened due to organic enrichment.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.5 m	5 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	27.5 ha	68 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Bachelor Brook
Forge Pond Brook
Weston Brook

Major Outflows: Bachelor Brook

LAKE WATERSHED:

Area: N/A

Topography: Northern watershed is part of Holyoke Range. Eastern and southern parts have rolling hills in outer perimeter of watershed - grading to lower relief and marsh areas nearer pond. Western part of watershed is lower relief.

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
Municipal treatment plant	None - plant is undersized

NONPOINT SOURCES:

Source	Controls in Place
Agricultural runoff	None

FORGE POND, WESTFORD/LITTLETON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality due to excessive nutrient input from a large watershed, and sediment regeneration of phosphorus.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impaired to to nutrient enrichment.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	10 m	33 ft.
Mean Depth:	3.37 m	11.1 ft.
Maximum Length:	1,440 m	4,725 ft.
Maximum Width:	792 m	2,599 ft.
Surface Area:	72.4 ha	179 acres
Volume:	2.44 million m^3	1,979 acre/ft.
Shoreline Length:	6,069 m	19,912 ft.
Development of Shoreline:	1.93	

Major Inflows: Beaver Brook
Gilson Bennett Brook

Major Outflows: Stony Brook

LAKE WATERSHED:

Area: 5,411 ha/13,371 acres

Topography: Very large watershed - most to southwest of pond. Irregular topography with many small hills and wetland depressions.

Major Soil Types: Hinckley, Paxton, Chatfield, Merrimac and Canton series

Land Use:	% of Total:
Forest	30.4
Residential/commercial	28.7
Wetland	18.7
Agricultural	13.6
Industrial	4.7
Highway corridor	2.4
Lakes (excluding Forge Pond)	1.0
Open	0.5

POINT SOURCES:

Source	Controls in Place
Industrial discharge	NPDES Permit limits for New England Apple Products Plant discharge

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	None
Agricultural erosion	None

FORT MEADOW RESERVOIR, HUDSON/MARLBOROUGH

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

The eastern basins are mesotrophic bordering an oligotrophic. The western basins are degraded by sediment and phosphorus loadings.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming and boating are impaired by the dense weed growth along the shore and in the western basins.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	8.5 m	28 ft.
Mean Depth:	3.3 m	11 ft.
Maximum Length:	1,200 m	3,960 ft.
Maximum Width:	707 m	2,320 ft.
Surface Area:	106 ha	263 acres
Volume:	3,645,000 m^3	2,955 acre/ft.
Shoreline Length:	9,040 m	29,600 ft.
Development of Shoreline:	2.47	

Major Inflows: Flagg Brook
Sheep Fall Brook

Major Outflows: Fort Meadow Brook

LAKE WATERSHED:

Area: 2,180 acres/881 ha

Topography: Drumlins, other very steep hills

Major Soil Types: Paxton - Woodbridge

Land Use:	% of Total:
Forest/wetland	51.0
Residential	34.0
Commercial/Industrial	6.0
Institutional	5.0
Landfill	2.0
Open	1.0
Cemetery	1.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
41 storm sewers	Proposed diversion of storm flow.

FOUNDRY POND, HINGHAM

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is poor. High nitrogen and moderately high phosphorus levels were present. D.O. was very low as was transparency. Pond is classified as eutrophic.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing is impaired by high nitrogen levels, low D.O. levels and dense macrophyte growth. Boating is impaired by shallow depth and macrophyte growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	2 m	6.5 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	3.2 ha	8 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Weir River flows in from south end.

Major Outflows: Outlet exits from north end of pond.

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
None known	--

NONPOINT SOURCES:

Source	Controls in Place
Road runoff	None
Surface runoff	None

FURNACE POND, PEMBROKE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Mesotrophic pond with high nutrient concentrations and dense growth of aquatic macrophytes around shore.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impaired by weed growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	2.7 m	9 ft.
Mean Depth:	1.5 m	5 ft.
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	43 ha	107 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Inlet from Oldham Pond
Inlet from Great Sandy Bottom Pond
Two inlets from cranberry bogs

Major Outflows: Herring Brook

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

GREAT POND, EASTHAM

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Fair water quality due to organic input from septic systems. This is a stratified, mesotrophic pond with moderate macrophyte growth. Episodic phytoplankton blooms occur.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are moderately impaired by organic enrichment.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	11 m	36.1 ft.
Mean Depth:	3.6 m	11.8 ft.
Maximum Length:	880 m	2,887 ft.
Maximum Width:	800 m	2,624 ft.
Surface Area:	44.7 ha	110.5 acres
Volume:	1.62 million m^3	1,315 acre/ft.
Shoreline Length:	3.095 km	10,154 ft.
Development of Shoreline:	1.31	

Major Inflows: Groundwater

Major Outflows: Groundwater

LAKE WATERSHED:

Area: Surface water 132.1 ha/326.5 acres
Groundwater 200.1 ha/494.5 acres

Topography: Mostly level terrain, of gravelly sand deposited as glacial outwash

Major Soil Types: Coarse series of Carver and Eastham soils, Freetown muck

Land Use:	% of Total:
Residential	67.7
Commercial	13.0
Forest	7.6
Water	5.3
Open (landfill/gravel pit)	4.3
Cemetery	2.1

POINT SOURCES:

Source	Controls in Place
None identified	--

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	None

GROVE POND, AYER

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Mesotrophic pond with low hypolimnetic dissolved oxygen concentrations, high phosphorus levels and dense weed growth.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impaired by the dense weed growth and tannery leachate.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.5 m	5 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	27.1 ha	67 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Inlet from Flannagan Pond
Cold Spring Brook
Bowers Brook

Major Outflows: Outlet to Plow Shop Pond

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

HALL'S POND, BROOKLINE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

This one acre pond serves as a settling basin for several storm drain discharges; hence, pond volume has decreased, shoreline encroachment is evident, and the water is turbid. Algal blooms, offensive odors and decreased wildlife diversity are the other consequences.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

The pond is a component of a small, inner-city wildlife sanctuary that supports passive recreation such as bird watching, painting and natural history activities. Stormwater flow has caused siltation, offensive odors.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	2.4 m	8.0 ft.
Mean Depth:	0.9 m	2.8 ft.
Maximum Length:	90.0 m	295 ft.
Maximum Width:	69.5 m	228 ft.
Surface Area:	4,047 m^2	1.0 acre
Volume:	3,454 m^3	2.8 acre/ft.
Shoreline Length:	252.1 m	827 ft.
Development of Shoreline:	1.1	

Major Inflows: Urban stormwater runoff

Major Outflows: 60" pipe discharges outflow to Charles River

LAKE WATERSHED:

Area: 107 acres

Topography: Gently slolped - elevations vary from 10 to 60 feet above mean sea level

Major Soil Types: Urban land, wet substratum
Merrimac - urban
Newport - urban
Udorthents - wet substratum

Land Use:	% of Total:
Multiple/single family dwellings	80.0
Recreation	9.0
Transportation	8.0
Conservation land and easements	3.0

POINT SOURCES:

Source	Controls in Place
Two urban storm sewers	N/A

NONPOINT SOURCES:

Source	Controls in Place
Urban surface runoff	N/A

HAMBLINS POND, BARNSTABLE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Mesotrophic/eutrophic lake with low dissolved oxygen in the hypolimnion, high phytoplankton counts, and high total phosphorus.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating, and fishing are imnpaired by algae blooms.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	19 m	63 ft.
Mean Depth:	20 m	34 ft.
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	60.3 ha	149 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Cranberry bog on northern shore

Major Outflows: None

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

HAMILTON RESERVOIR, HOLLAND

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Chlorophyll a, total phosphorus and secchi disc measurements indicate general mesotrophic conditions.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impaired by nuisance aquatic macrophyte growth and sediment deposition in coves.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	6.5 m	21.5 ft.
Mean Depth:	2.1 m	6.8 ft.
Maximum Length:	4,410 m	14,450 ft.
Maximum Width:	1,360 m	4,450 ft.
Surface Area:	167 ha	413 acres
Volume:	3.579×10^6 m^3	2,835 acre/ft.
Shoreline Length:	20,120 m	59,000 ft.
Development of Shoreline:	0.96	

Major Inflows: Leadmine Brook
Steven's Brook
Brown's (May) Brook

Major Outflows: Outlet flows north to Holland Pond

LAKE WATERSHED:

Area: 4,488 ha/11,090 acres

Topography: Irregularly contoured and variably sloping throughout

Major Soil Types: Hinckley-Windsor-Muck, Paxton-Hollis-Canton, Brimfield-Brookfield

Land Use:	% of Total:
Agriculture	3.0
Residential	5.0
Commercial	1.0
Transportation	1.5
Open space	1.5
Forest	84.0
Water/wetlands	4.0

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Erosion	None
Stormwater runoff	Anticipated construction of sedimentation basins
Septic systems	Anticipated septic system maintenance program

HARDY POND, WALTHAM

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Excessive loading of phosphorus and sediments to this urban pond, as well as internal loading of phosphorus from existing sediments, has generated massive populations of algal and aquatic plants. The pond is eutrophic.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

The recreational and aesthetic value of Hardy Pond is severely degraded due to excessive sediment loading, growth of macrophytes, and algal blooms. Siltation and nutrient loading are the principal causes.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.2 m	4 ft.
Mean Depth:	0.6 m	1.9 ft.
Maximum Length:	716 m	2.35×10^3 ft.
Maximum Width:	472 m	1.55×10^3 ft.
Surface Area:	1.7×10^5 m^2	42 acres
Volume:	9.87×10^4 m^3	80 acre/ft.
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: The principal inlet is an unnamed tributary at the northeast corner of the pond.

Major Outflows: Overflow weir-type structure at northeast end of pond, which drains into Chester Brook.

LAKE WATERSHED:

Area: 907 acres

Topography: "Varied", with elevations ranging between 197 feet and 360 feet above mean sea level.

Major Soil Types: Range from poorly drained organic muck to well drained sandy loam and stony sand loam.

Land Use:	% of Total:
Residential: 1 & 2 family dwellings	73.0
multiple family dwellings	5.0
Commercial	7.0
Conservation land and easements	15.0

POINT SOURCES:

Source	Controls in Place
Storm sewers	No

NONPOINT SOURCES:

Source	Controls in Place
Storm sewers	No
Urban runoff	

HERRING POND, EASTHAM

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

The pond is classified as mesotrophic with summer blooms of algae.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impaired due to algal blooms and decreased transparency.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	10.7 m	35 ft.
Mean Depth:	--	--
Maximum Length:	580 m	1,900 ft.
Maximum Width:	340 m	1,100 ft.
Surface Area:	11.6 ha	29 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Salt water flows in from the southeast borders at high tide

Major Outflows: Salt water flows out from the southeast border at low tide

LAKE WATERSHED:

Area: N/A

Topography: Much of the watershed is wetlands

Major Soil Types: Carver soils, Freetown muck, Eastchop soils

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

HILLS POND, ARLINGTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Hill's Pond is in the eutrophic stage. Current problems include low water level, extensive macrophyte growth, algal blooms and sediment accumulation at storm drain.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Passive recreation (aesthetics) some fishing and canoeing are impacted by low water level, macrophytes and algal blooms.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.7 m	5.7 ft.
Mean Depth:	0.9 m	3.0 ft.
Maximum Length:	146 m	480 ft.
Maximum Width:	73 m	238 ft.
Surface Area:	0.8 ha	2 acres
Volume:	7,400 m^3	6 acre/ft.
Shoreline Length:	0.4 km	0.25 m
Development of Shoreline:	1.3	

Major Inflows: Storm drain from Valley Road/Churchill Avenue

Major Outflows: Overflow drain to storm sewer to Spy Pond

LAKE WATERSHED:

Area: 15 acres

Topography: Rolling hills

Major Soil Types: Gloucester stony fine sandy loam

Land Use:	% of Total:
Open parkland	66.0
Residential lots and paved roadways	34.0

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Storm drain	Anticipated sedimentation basin
Overland runoff (minor)	None

LAKE HOLBROOK, HOLBROOK

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is poor. High nutrient levels and shallow depths contribute to the high algal counts and dense macrophyte growths in the pond. Sediments are contaminated with organic compounds and pesticides.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Boating and fishing are impaired by shallow depth and dense macrophyte growth. Low levels of dioxin were found in fish.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.5 m	5 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	13 ha	32 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Trout Brook at southeast end of pond

Major Outflows: Outlet at northwest end

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
None known	--

NONPOINT SOURCES:

Source	Controls in Place
Residential lawn fertilizers	None
Possible industrial sources	None

HORN POND, WOBURN

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Characterized by high nitrogen and phosphorus levels, anoxia in the hypolimnion (summer) phytoplankton blooms (spring diatoms; summer greens), and low transparency, all which indicate a eutrophic condition.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, fishing and aesthetics are impaired by algal blooms, low transparency, high bacteria and nutrients. The potential exists for some toxic effects to fishing.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	13.1 m	43 ft.
Mean Depth:	7 m	23 ft.
Maximum Length:	884 m	2,900 ft.
Maximum Width:	472 m	1,550 ft.
Surface Area:	42 ha	104 acres
Volume:	2.951 x 10^6 m^3	2,392 acre/ft.
Shoreline Length:	3,651 m	11,980 ft.
Development of Shoreline:	1.59	

Major Inflows: Fowle Brook
Sucker Brook
Town Meadow Brook

Major Outflows: Pond Brook

LAKE WATERSHED:

Area: 4,946 acres (7.7 mi^2) - about 20 km^2

Topography: Rolling hills with scattered rugged hills. High relief in the immediate proximity of the pond.

Major Soil Types: Chatfield-Hollis - rock outcrop series (hydrologic groups)

Land Use:	% of Total:
Residential	62.5
Commercial	10.5
Industrial	0.9
Forest	14.3
Open	5.6
Wetland	3.6
Agriculture	2.0

POINT SOURCES:

Source	Controls in Place
Storm sewers	None

NONPOINT SOURCES:

Source	Controls in Place
Storm sewers	None
Wastewater	None
Streambank erosion	None
Internal loading	None

INDIAN LAKE, WORCESTER

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Indian Lake is in the eutrophic stage. Prior to herbicide treatment in 1986, aquatic macrophytes were very dense. Algal blooms occur periodically throughout the summer months. Untreated sewage is discharged into the lake sporadically when the Holden Street pump station overflows.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, fishing & boating are all impaired by high bacteria counts, dense macrophytes and algal blooms.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	6.1 m	20 ft.
Mean Depth:	3.3 m	10.7 ft.
Maximum Length:	1,646 m	5,400 ft.
Maximum Width:	762 m	2,500 ft.
Surface Area:	781,071 m^2	193 acres
Volume:	2.55 x 10^6 m^3	2,066 acre/ft.
Shoreline Length:	610 m	2,000 ft.
Development of Shoreline:	1.94	

Major Inflows: Ararat Brook Inlet
Northwest Inlet
Route 122 Inlet

Major Outflows: Outlet to Salisbury Pond via Weasel Brook

LAKE WATERSHED:

Area: 2,003 acres

Topography: Quite hilly, little wetland drainage

Major Soil Types: Charlton-Paxton-Woodbridge

Land Use:	% of Total:
Residential	58.0
Open	12.0
Forest	21.0

POINT SOURCES:

Source	Controls in Place
Combined sewer overflows	None

NONPOINT SOURCES:

Source	Controls in Place
Surface runoff	None

JENNINGS POND, NATICK

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

A high organic/inorganic pollutant load from stormwater has caused the pond to become highly sedimented with dense macrophyte growth.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Boating and fishing are restricted due to dense aquatic plant growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	2.8 m	9.1 ft.
Mean Depth:	1.3 m	4.3 ft.
Maximum Length:	443 m	1,455 ft.
Maximum Width:	119 m	390 ft.
Surface Area:	3.8 ha	9.4 acres
Volume:	49,360 m^3	40 acre/ft.
Shoreline Length:	1,122 m	3,680 ft.
Development of Shoreline:	1.74	

Major Inflows: Western inlet from Little Jennings Pond

Major Outflows: Northeast outlet to Morses Pond

LAKE WATERSHED:

Area: 2.56 sq. miles

Topography: Gently sloping hills with occasional drumlins

Major Soil Types: Hinckley, Paxton, Man-made, Muck, Woodbridge

Land Use:	% of Total:
Forest	10.4
Agriculture/open land	13.0
Wetland/water	18.2
Mining, waste disposal	2.6
Urban	55.8

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Urban runoff	Anticipated filter berms
Sedimentation	

KENDALL POND, GARDNER

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Kendall Pond has exhibited symptoms of nutrient enrichment within the last ten years. The pond is presently in a mesotrophic stage.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, fishing and boating are the primary recreational values.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	--	--
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	9.31×10^4 m^2	23 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Groundwater

Major Outflows: Groundwater

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

LAGOON POND, OAK BLUFFS/TISBURY

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

The major problems are coliform bacteria from runoff and septic leachate. Nutrients are high on occasion causing excessive algae and aquatic macrophyte growth which in turn impacts health of shellfish beds.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Shellfish, swimming and boating impaired by high coliforms and an overgrowth of algae macrophytes due to high nutrients.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	8.83 m	29 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	216.5 ha	535 acres
Volume:	--	--
Shoreline Length:	11.6 km	7.3 miles
Development of Shoreline:	--	

Major Inflows: Outlet from Brush Pond
Mud Creek
Upper Lagoon Pond

Major Outflows: Lagoon Pond/Vineyard Haven inlet/outlet (tidal)

LAKE WATERSHED:

Area: 6.99 sq. mi^2/18.1 km^2

Topography: N/A

Major Soil Types: Sand, gravel, silt, small boulders

Land Use:	% of Total:
Agriculture	N/A
Residential	N/A
Industrial/Business	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Agricultural runoff	None
Road runoff	None
Septic leachate	None

LAKE LASHAWAY, EAST BROOKFIELD/NORTH BROOKFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

This lake is classified as mesotrophic with moderate nutrient levels and shallow morphometry.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are threatened due to macrophytes in littoral areas.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	4.6 m	15 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	109 ha	270 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Five Mile River

Major Outflows: East Brookfield River

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Agriculture	Dredging project has removed excessive sedimentation from cove near inlet.
Silviculture	Drawdown currently controls macrophytes in littoral areas.

LITTLE SANDY BOTTOM POND, PEMBROKE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Mesotrophic/oligotrophic pond with high phosphorus levels and summer algae blooms.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating, and fishing impaired by algae blooms.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	6.4 m	21 ft.
Mean Depth:	2.7 m	9 ft.
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	24 ha	61 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: N/A

Major Outflows: Outlet to cranberry bogs and Great Sandy Bottom Pond

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

LONG POND, BARNSTABLE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Characterized by low alkalinity, pH values between 6 and 7 and high chloride concentrations.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are recreational values of the pond.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	7 m	22 ft.
Mean Depth:	2.6 m	8 ft.
Maximum Length:	975 m	3,200 ft.
Maximum Width:	335 m	1,100 ft.
Surface Area:	20.2 ha	50 acres
Volume:	518,070 m^3	420 acre/ft.
Shoreline Length:	2,591 m	8,500 ft.
Development of Shoreline:	1.6	

Major Inflows: Inlet from Wequaquet Lake
Groundwater

Major Outflows: Outlet discharges to Centerville River

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: Plymouth, Merrimac, Hinckley

Land Use:	% of Total:
Residential Forest	N/A

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Septic systems Cranberry bogs Road runoff	Diagnostic/Feasibility Study currently underway

LONG POND, DRACUT/TYNGSBOROUGH, MA, AND PELHAM, NH

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is fairly good. There are some localized areas of dense vegetation. Moderate phosphorus levels are present. Good D.O. levels are present except at sediment interface. Blue-greens are present and may be a problem in future.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are the primary recreational activities on the pond.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	7.6 m	25 ft.
Mean Depth:	1.03 m	3.4 ft.
Maximum Length:	213 m	7,000 ft.
Maximum Width:	609 m	2,000 ft.
Surface Area:	65 ha	163 acres
Volume:	4445.23 m^3	3.6 acre/ft.
Shoreline Length:	57,912 m	19,000 ft.
Development of Shoreline:	2.01	

Major Inflows: Three inlets from marshy areas

Major Outflows: Double Brook to Beaver Brook

LAKE WATERSHED:

Area: N/A

Topography: Low relief hills around most of pond. Urbanized on eastern shore. Marsh lands on southern perimeter of pond.

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

LONG POND, LITTLETON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Mesotrophic stage with dense macrophyte growths. Nutrient sources include storm drains and septic systems.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impaired by dense macrophytes, high nutrient loading and high bacteria levels in storm runoff.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	6.1 m	20 ft.
Mean Depth:	2.2 m	7.2 ft.
Maximum Length:	930 m	3,050 ft.
Maximum Width:	472 m	1,550 ft.
Surface Area:	356,136 m^2	88 acres
Volume:	552,328 m^3	447.73 acre/ft.
Shoreline Length:	2,777 m	9,111 ft.
Development of Shoreline:	1.56	

Major Inflows: One intermittent stream, enters on north shore
Storm drains along northern shore

Major Outflows: One outlet flowing to the south

LAKE WATERSHED:

Area: N/A

Topography: Rolling hills

Major Soil Types: N/A

Land Use:	% of Total:
Primarily forested Residential area at eastern end	N/A

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Surface runoff Septic systems	N/A

LONG POND, YARMOUTH

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is very poor. Severe algal blooms, excessive macrophyte growth and fish kills occur. Septic plumes entering through groundwater and storm-water runoff are a problem.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are the major recreational values of the pond.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	9.9 m	32 ft.
Mean Depth:	3.1 m	10 ft.
Maximum Length:	1,486 m	4,800 ft.
Maximum Width:	294 m	950 ft.
Surface Area:	24 ha	59 acres
Volume:	0.74 x 10^6 m^3	600 acre/ft.
Shoreline Length:	4,087 m	13,200 ft.
Development of Shoreline:	2.32	

Major Inflows: No major tributaries. Inflow is mainly from some 18 drainage ditches/catch basin outlets.

Major Outflows: Parkers River at the southwestern end of the pond.

LAKE WATERSHED:

Area: 61.8 ha/152 acres

Topography: Land is generally a smooth, broad sandy plain with a gradual slope.

Major Soil Types: Carver coarse sands, isolated patches of Freetown/Swansea Muck and Au Gres Loamy Coarse.

Land Use:	% of Total:
Residential	58.0
Recreational	6.0
Open space - undeveloped	20.0
Roadways	16.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Septic plumes	Presently none. Anticipated stormwater leaching basin and drain fields.

LONG POND, SPRINGFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality due to severe plant and algal growth.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Pond was once used for swimming which is now prohibited due to plant growth. Fishing still occurs but is impaired.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.2 m	4 ft.
Mean Depth:	0.4 m	1.2 ft.
Maximum Length:	384 m	1,260 ft.
Maximum Width:	265 m	870 ft.
Surface Area:	5.1 ha	12.6 acres
Volume:	18,500 m^3	15.0 acre/ft.
Shoreline Length:	1,070 m	3,500 ft.
Development of Shoreline:	1.33	

Major Inflows:

No inlets observed

Major Outflows:

No outlets observed

LAKE WATERSHED:

Area: N/A

Topography: The area is principally residential with gentle rolling hills

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

LOON POND, SPRINGFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is good. However, pond is showing signs of accelerated eutrophication with elevated nutrients and low D.O.'s in hypolimnion.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming is threatened by algal blooms and stormwater discharge. Fishing threatened by low D.O. in hypolimnion.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	7.6 m	25 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	11.7 ha	29 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Groundwater

Major Outflows: Groundwater

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
Storm drains	None

NONPOINT SOURCES:

Source	Controls in Place
Surface runoff	None

LAKE LORRAINE, SPRINGFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is good. Moderate levels of nutrients were present giving this lake a low mesotrophic rating.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming is threatened by weed growth and decreasing water quality because of storm runoff. Fishing is threatened by low D.O. in hypolimnion.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	10.7 m	35 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	10.9 ha	27 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Groundwater

Major Outflows: Groundwater

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
Storm drains	None

NONPOINT SOURCES:

Source	Controls in Place
Surface runoff	None

LOST LAKE/KNOPPS POND, GROTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Overall the water quality is fair. However, portions of the pond have very dense growth of aquatic macrophytes.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are somewhat impaired due to macrophyte growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	9.1 m	30 ft.
Mean Depth:	1.8 m	5.8 ft.
Maximum Length:	1,770 m	5,800 ft.
Maximum Width:	1,100 m	3,600 ft.
Surface Area:	82.6 ha	204 acres
Volume:	$1,454 \times 10^6$ m^3	1,179 acre/ft.
Shoreline Length:	11,000 m	36,000 ft.
Development of Shoreline:	3.40	

Major Inflows: Unnamed brook at southwest corner and Pond Brook entering along the northwest shore.

Major Outflows: The outlet flows out of the north end of the lake into Whitney Pond.

LAKE WATERSHED:

Area: 1,100 ha/2,720 acres

Topography: Mostly forested, sparsely populated with some wetland area.

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Septic leachate	None
Watershed runoff	None

LAKE MANSFIELD, GREAT BARRINGTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Lake is hypereutrophic. Eurasian milfoil has completely inundated lake except at the public beach, where it is controlled.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing and boating are recreational pursuits that have come to a halt during the growing season. Swimming is threatened, and it is dangerous to swim outside of the public beach zone. Problem is nuisance plant growth stimulated by excess nutrients.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	4.9 m	16 ft.
Mean Depth:	1.9 m	6.2 ft.
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	16.2 x 10^4 m^2	40 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: N/A

Major Outflows: N/A

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

MARTINS POND, NORTH READING

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality is apparent. High phosphorus input from septic systems and the Skug River result in severe algal blooms.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are moderately impaired due to algal blooms.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	2.21 m	7.25 ft.
Mean Depth:	1.42 m	4.65 ft.
Maximum Length:	930 m	3,050 ft.
Maximum Width:	594 m	1,950 ft.
Surface Area:	37 ha	92 acres
Volume:	51 ha/m	414 acre/ft.
Shoreline Length:	2,743 m	9,000 ft.
Development of Shoreline:	1.27	

Major Inflows: Skug River located at the northern border of the pond

Major Outflows: Martins Brook, located at the southern border of the pond.

LAKE WATERSHED:

Area: 2,047 hectares/5,057 acres

Topography: The basin of the pond was formed by a glacial ice block that melted between two eskers on the north and east, and a drumlin on the west. The rest of the watershed is made up of several discontinuous ridges.

Major Soil Types: N/A

Land Use:	% of Total:
Residential	19.10
Forest	66.26
Wetland/water	7.75
Agriculture	3.16
Open-public	1.74
Recreation	1.74
Commercial	0.24

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Skug River (collecting runoff from the watershed)	Presently none
Septic leachate	Presently none; anticipated pressurized sewers.

LAKE MASCUPPIC, DRACUT/TYNGSBOROUGH

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality due to organic enrichment from septic systems and watershed inputs. Luxuriant growths of algae and aquatic weeds occur. No oxygen is present in the bottom waters. Low transparency and high nutrient content are problems.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are threatened due to organic enrichment.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	8.8 m	29 ft.
Mean Depth:	4.3 m	14 ft.
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	84.6 ha	209 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Groundwater and flow from Althea Lake

Major Outflows: Stream to Lawrence Brook and Merrimack River

LAKE WATERSHED:

Area: N/A

Topography: Gently rolling hills around the north, east and south side. Level terrain on southwest side. A marsh and pond system on south side.

Major Soil Types: Merrimac, Hinckley, Gloucester (stoney, fine) muck and peat.

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

MASHPEE/WAKEBY PONDS - MASHPEE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is good. Elevated phosphorus, low hypolimnetic D.O. and dense macrophyte growths in the littoral zone of shallow areas have contributed to a low mesotrophic rating.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming may be threatened by algal blooms and macrophyte growths if watershed development continues to increase phosphorus load.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	26 m	87 ft.
Mean Depth:	8.2 m	27 ft.
Maximum Length:	2,195 m	7,200 ft.
Maximum Width:	1,097 m	3,600 ft.
Surface Area: (Combined area)	295 ha	729 acres
Volume	24,697,137 m^3	20,022 acre/ft.
Shoreline Length:	9,509 m	31,200 ft.
Development of Shoreline:	1.5	

Major Inflows: Seepage Lakes

Major Outflows: Seepage and outflow at southern end of lake

LAKE WATERSHED:

Area: N/A

Topography: Steep sided kettles

Major Soil Types: N/A

Land Use:	% of Total:
Mostly residential	N/A

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Groundwater	None
Septic systems	None

LAKE MASSAPOAG, SHARON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

A moderate nutrient loading from watershed causes this pond to be classified as mesotrophic.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, boating and swimming are threatened due to algal blooms and macrophytes. This is a result of the nutrient loading.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	13.7 m	45 ft.
Mean Depth:	4.45 m	14.59 ft.
Maximum Length:	2,082 m	6,831 ft.
Maximum Width:	1,240 m	4,068 ft.
Surface Area:	160 ha	397 acres
Volume:	7,141,222 m^3	5,789 acre/ft.
Shoreline Length:	6,309 m	20,700 ft.
Development of Shoreline:	1.40	

Major Inflows: Sucker Brook

Major Outflows: Massapoag Brook

LAKE WATERSHED:

Area: 2,239.4 acres

Topography: Low rolling, glacial topography dominated.

Major Soil Types: Canton, Hinckley, Merrimac

Land Use:	% of Total:
Forest	59.0
Lake	18.0
Residential	17.0
Open	2.0
Landfill	1.0
Agriculture	2.0
Institutional	1.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Urban runoff	N/A

LAKE MASSASOIT, SPRINGFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

The lake is characterized by highly variable detention time, large pollutant loads, periodic algal blooms, extensive summer growths of the macrophyte, Ceratophyllum, and severely depressed summer oxygen levels.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing is threatened by dense and extensive macrophyte growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	5.94 m	19.5 ft.
Mean Depth:	3.05 m	10.0 ft.
Maximum Length:	1.4 km	0.87 mi.
Maximum Width:	0.24 km	0.15 ml
Surface Area:	200 acres	0.81 km^2
Volume:	2.47 x 10^6 m^3	2,000 acre/ft.
Shoreline Length:	11.93 km	7.41 mi.
Development of Shoreline:	3.76	

Major Inflows: North branch of Mill River
South branch of Mill River
Carlisle Brook
Several storm drains

Major Outflows: Mill River

LAKE WATERSHED:

Area: 81.3 km^2 (20,350 acres)

Topography: Generally mild slopes throughout the watershed with over steepened slopes along portions of lake shoreline.

Major Soil Types: Glacial delta outwash and terraced sandy alluvium.

Land Use:	% of Total:
Forest	22.5
Residential	45.5
Recreation/open space	15.6
Commercial/institutional	6.1
Industrial	3.9
Water	2.4
Agricultural	2.2
Cemeteries	1.8

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Urban runoff	Anticipated dredging of upstream areas, drawdown and flow regulation.
Sedimentation	

LAKE METACOMET, BELCHERTOWN

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

An excessive loading of the limiting nutrient, phosphorus, is apparent.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, fishing and boating. All are threatened by nuisance aquatic weeds.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	4.9 m	16 ft.
Mean Depth:	3.2 m	10.5 ft.
Maximum Length:	711 m	2,333 ft.
Maximum Width:	406 m	1,333 ft.
Surface Area:	28.3 ha	70 acres
Volume:	617,606 m^3	500 acre/ft.
Shoreline Length:	24,135 m	1.5 mi.
Development of Shoreline:	2.6	

Major Inflows: Northeast inlet

Major Outflows: Bachelor Brook flows southeast out of the lake

LAKE WATERSHED:

Area: 680 acres

Topography: Characterized by steep slopes in the upper watershed area and wetlands near the pond.

Major Soil Types: Hinckley-Wethersfield-Windsor soil associations.

Land Use:	% of Total:
Forest	67.0
Residential	11.0
Agriculture	2.0
Open land	6.0
Wetland	7.0
Lake	7.0

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	Ongoing septic system inspection and maintenance program.

MILL POND, WEST NEWBURY

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Overall water quality in Mill Pond and its tributaries is high with good transparency. Low bacterial levels and adequate dissolved oxygen are present. High macrophyte densities are caused by shallow depths and rich organic sediments.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are all impaired by weed growth and siltation.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	2.5 m	8.1 ft.
Mean Depth:	1.25 m	4.1 ft.
Maximum Length:	547 m	1,790 ft.
Maximum Width:	263 m	862 ft.
Surface Area:	6.5 ha	16 acres
Volume:	80,800 m^3	65 acre/ft.
Shoreline Length:	1,500 m	4,940 ft.
Development of Shoreline:	1.67	

Major Inflows: Sawmill Brook flows into the pond at the southwest end and an unnamed tributary flows into the pond at the southeast end.

Major Outflows: The only outlet flows from the north end of the pond forming the Indian River.

LAKE WATERSHED:

Area: 376 hectares/929 acres

Topography: The watershed terraine is hilly with moderately steep slopes.

Major Soil Types: Charlton-Sutton - well to moderately well drained soils
Ridgebury-Whitman - poorly to very poorly drained soils
Paxton-Woodridge - well to moderately well drained soils

Land Use:	% of Total:
Forested	60.0
Residential	17.0
Agricultural	17.0
Open	1.0
Public/open	1.0
Recreational	1.0
Wetland	1.0
Water	2.0

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Agriculture (non-irrigated crop production)	None
On-site wastewater systems	None
Atmospheric deposition	None

MONA LAKE, SPRINGFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality due to severe aquatic plant growth.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming and fishing (historical only) are severely impaired due to plant growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	4.6 m	15 ft.
Mean Depth:	--	--
Maximum Length:	370 m	1,200 ft.
Maximum Width:	185 m	600 ft.
Surface Area:	--	--
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: No tributaries observed. Only one storm drain present (dry in summer)

Major Outflows: No tributaries observed.

LAKE WATERSHED:

Area: N/A

Topography: The area immediately around the pond is residential and basically flat.

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Possible septic leachate	None

LAKE MIRIMICHI, PLAINVILLE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Lake Mirimichi is in the eutrophic stage. Dense macrophyte stands are present in several coves. The overall density is light-medium. Phytoplankton counts are low.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, swimming and boating are all impaired by dense macrophytes.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	6.8 m	22.4 ft.
Mean Depth:	2.3 m	7.4 ft.
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	68.9 ha	169.5 acres
Volume:	1.54×10^6 m^3	1,252 acre/ft.
Shoreline Length:	8,611 m	28,250 ft.
Development of Shoreline:	--	

Major Inflows: Turtle and Mill Brooks (outflow from Turnpike Lake), Rabbit Hill Brook.

Major Outflows: .Wading River

LAKE WATERSHED:

Area: 7,723 acres

Topography: Relatively flat, swampy; significant wetland areas present in watershed.

Major Soil Types: N/A

Land Use:	% of Total:
Residential	N/A
Commercial	
Industrial	
Open-recreational	

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	None
Wetlands	

EAST AND WEST MONPONSETT PONDS, HALIFAX

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Fair water quality due to septic leachate, siltation and watershed runoffs.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Impairment to swimming, boating and fishing is due to increasing aquatic weed growth, siltation, runoffs and leachates.

LAKE/POND CHARACTERISTICS:

	West Monponsett		East Monponsett	
	Metric	English	Metric	English
Maximum Depth:	4.0	13.0 ft.	4.0 m	13.0 ft.
Mean Depth:	2.1 m	7.0 ft.	2.1 m	7.0 ft.
Maximum Length:	1,950 m	6,400 ft.	1,750 m	5,740 ft.
Maximum Width:	900 m	2,950 ft.	1,075 m	3,525 ft.
Surface Area:	112 ha	276 acres	100 ha	246 acres
Volume:	$2.4 \times 10^6 m^3$	1,932 ac/ft.	$2.1 \times 10^6 m^3$	1,722 ac/ft.
Shoreline Length:	6,760 m	22,176 ft.	5,630 m	18,480 ft.
Development of Shoreline:		1.8		

Major Inflows: Stetson Brook enters West Monponsett at its northern end. White Oak enters East Monponsett at its northern end.

Major Outflows: Stump Brook is the outlet of West Monponsett located at the pond's southern edge and a diversion to Silver Lake.

LAKE WATERSHED:

Area: West Pond 772 ha/1,907 acres; East Pond 834 ha/2,060 acres

Topography: Area around both ponds is developed. Area was formerly composed of low sand and gravel hills.

Major Soil Types: Glacial till, swamp deposits, Windsor, Merrimac, Peat, Au Gres/Wareham.

Land Use:	% of Total:	
	West Pond	East Pond
Forest	61.8	55.2
Agriculture	9.0	7.0
Residential	12.7	18.7
Wetland	1.2	0.7
Water	15.1	17.9
Urban	0.3	0.5

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Septic system leachate	none
Storm drain discharge	none

NASHAWANNUCK POND, EASTHAMPTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality. High input of nutrients has resulted in excessive macrophyte and algal growth.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming is a historical activity since the public beach has been closed due to plant growth. Boating and fishing are moderately impaired due to plant and algal growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	5.5 m	18 ft.
Mean Depth:	1.5 m	5 ft.
Maximum Length:	1,067 m	3,500 ft.
Maximum Width:	457 m	1,500 ft.
Surface Area:	11.3 ha	27.9 acres
Volume:	155,350 m^3	125.9 acre/ft.
Shoreline Length:	3,658 m	12,000 ft.
Development of Shoreline:	3.07	

Major Inflows: Broad Brook enters the pond from the southeast.

Major Outflows: Broad Brook exits the pond via a dam at its northern end.

LAKE WATERSHED:

Area: 2,686 hectares/6,636 acres

Topography: Eastern half of the watershed encompasses the Mt. Tom range. The western half is primarily flat with forest and agricultural land.

Major Soil Types: N/A

Land Use:	% of Total:
Forest	43.0
Residential	24.0
Agriculture	22.0
Public/open	4.0
Industrial/commercial	3.0
Water/wetland	2.5
Other uses	1.5

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Watershed runoff	none
Storm drain discharge	none

NEPONSET RESERVOIR, FOXBORO

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Hypereutrophic due to industrial discharge of phosphorus and shallow morphometry.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, fishing, and boating are impaired due to excessive algal blooms resulting from very high phosphorus levels.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	2.5 m	8 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	108 ha	268 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Industrial discharge
Groundwater

Major Outflows: Neponset River

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

NORTH POND, HOPKINTON/MILFORD/UPTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

This pond is characterized by low hypolimnetic dissolved oxygen in the summer, summer algal blooms (chlorophyta), very dense aquatic vegetation (Myriophyllum exalbescens and Cabomba caroliniana), and moderate total phosphorus levels. The pond is in the eutrophic stage.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Boating and fishing are impaired by aquatic vegetation. Algal blooms and low clarity threaten use of the pond for swimming. Potential organic toxicity and salinity may be a problem if pond is used as a water supply

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	6 m	20 ft.
Mean Depth:	2.4 m	8 ft.
Maximum Length:	3,383 m	11,100 ft.
Maximum Width:	805 m	2,640 ft.
Surface Area:	96.6 ha	238.6 acres
Volume:	2,350,000 m^3	1,909 acre/ft.
Shoreline Length:	10,287 m	6.4 mi.
Development of Shoreline:	2.95	

Major Inflows: Unnamed eastern inlet
Groundwater

Major Outflows: Mill River

LAKE WATERSHED:

Area: 734 hectares/1,813 acres

Topography: Varied with upstream ponds and wetlands, elevation ranges from 348-586 feet above mean sea level. Seven sub-drainage areas.

Major Soil Types: Stony fine sandy loam - Paxton, Canton, Montauk, Woodbridge

Land Use:	% of Total:
Residential	10.3
Commercial	1.1
Industrial	2.3
Forest	79.7
Wetlands	6.1
Recreational	0.5

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
On-site wastewater systems	None
Storm sewers	None

NORTON RESERVOIR, NORTON/MANSFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Hypereutrophic due to excessive nutrient loading and shallow morphometry.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, boating and swimming are impaired due to extreme levels of phytoplankton resulting from excessive nutrient loading.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	2.9 m	9.5 ft.
Mean Depth:	1.0 m	3.2 ft.
Maximum Length:	3.29 km	10,800 ft.
Maximum Width:	1.59 km	5,200 ft.
Surface Area:	210 ha	519 acres
Volume:	2.03×10^6 m^3	1,664 acre/ft.
Shoreline Length:	13.7 km	45,000 ft.
Development of Shoreline:	2.57	

Major Inflows: Rumford River
Backbay Brook

Major Outflows: Rumford River

LAKE WATERSHED:

Area: 51.1 km^2

Topography: Rolling hills interrupted by low-lying marsh areas.

Major Soil Types: Hinckley-Merrimac-Sudbury
Whitman-Muck-Ridgebury

Land Use:	% of Total:
Forest	64.8
Residential	18.9
Open	6.6
Open water	4.1
Agriculture	3.6
Industrial/commercial	2.0

POINT SOURCES:

Source	Controls in Place
Municipal plants (former discharges)	N/A

NONPOINT SOURCES:

Source	Controls in Place
Urban	N/A
Agriculture	

OLDHAM POND, PEMBROKE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

This is a mesotrophic pond with high nutrient levels and dense growths of aquatic macrophytes along the shore.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impaired by dense weed growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	4.6 m	15 ft.
Mean Depth:	3 m	10 ft.
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	95 ha	235 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Two unnamed tributaries in northwestern cove
Two cranberry bogs on western shore

Major Outflows: Outlet to Furnace Pond

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

ONOTA LAKE, PITTSFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is good; oligotrophic level.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming may be threatened by algal blooms if development in the watershed continues. Fishing is threatened by hypolimnetic anoxia.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	19.4 m	64 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	250 ha	617 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: N/A

Major Outflows: N/A

LAKE WATERSHED:

Area: 10.3 $mi.^2$

Topography: Steeply sloping hilly terrain

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Agricultural	None
Fertilizers	None
Atmospheric	None
Septic systems	None

PARKER POND, GARDNER

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

The accumulation of sediments and extensive growth of macrophytes indicate it is in a eutrophic state.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Other than limited boating (nonpowered), Parker Pond is no longer used for public recreation due to its shallow depth and the extensive growth of macrophytes.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.5 m	5 ft.
Mean Depth:	0.6 m	2 ft.
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	1.05×10^5 m^2	26 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: N/A

Major Outflows: N/A

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
Storm sewers	None

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

PATCH RESERVOIR, WORCESTER

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Patch Reservoir is classified as mesotrophic. In-lake and tributary nutrient levels ae moderate to high. Macrophytes are sparse but phytoplankton counts are high. Bacteria levels are, in general, low except for one tributary.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Aesthetics, fishing, and boating are the recreational values of this waterbody.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	--	--
Mean Depth:	--	--
Maximum Length:	1,890 m	6,200 ft.
Maximum Width:	354 m	1,160 ft.
Surface Area:	125,457 m^2	31 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Unnamed tributary - northwest shore
Tatnuck Brook - northwest shore

Major Outflows: One in southeast cove

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
Primarily residential Commercial/industrial (airport) Forest	N/A

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Surface runoff	None
Storm sewers	None

PEQUOT POND, WESTFIELD/SOUTHAMPTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Mesotrophic lake with internal phosphorus loading and dense macrophyte growth along shoreline and in cove areas.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impaired by dense weed growth, nutrients from septic systems, and siltation.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	7.8 m	25.5 ft.
Mean Depth:	4.57 m	15 ft.
Maximum Length:	1,270 m	41.67 ft.
Maximum Width:	850 m	2,789 ft.
Surface Area:	67.3 ha	166.4 acres
Volume:	3.1 x 10^6 m^3	2,496 acre/ft.
Shoreline Length:	5,125 m	16,814 ft.
Development of Shoreline:	1.8	

Major Inflows: Inlet from Long Pond on western shore
Inlet from wetlands north of the pond
Inlet on eastern shore

Major Outflows: Outlet to Horse Pond

LAKE WATERSHED:

Area: 673 ha/1,663 acres

Topography: Steeply sloped hills

Major Soil Types: Charlton-Paxton-Woodbridge

Land Use:	% of Total:
Forest	58.4
Agriculture	13.9
Residential	13.7
Open water	11.5
Open space	2.4
Wetland	0.1

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Septic system leachate	Sewers proposed
Erosion/sedimentation	Sedimentation basin to be funded and constructed under Phase II grant

PINEWOOD POND, STOUGHTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Pinewood Pond is in the eutrophic stage. Macrophyte growths are very dense. Phytoplankton and bacteria counts are low. Phosphorus levels in the unnamed western tributaries are very high (0.13 mg/1).

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Boating and fishing impaired by dense macrophytes.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.2 m	4 ft.
Mean Depth:	0.6 m	2 ft.
Maximum Length:	366 m	1,200 ft.
Maximum Width:	335 m	1,100 ft.
Surface Area:	97,128 m^2	24 acres
Volume:	56,993 m^3	46.2 acre/ft.
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Unnamed western tributary

Major Outflows: Unnamed northern tributary

LAKE WATERSHED:

Area: 187.8 acres

Topography: Relatively flat

Major Soil Types: N/A

Land Use:	% of Total:
Wooded (75 acres)	40.0
Residential	60.0

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Surface runoff	None

POMPS POND, ANDOVER

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality is apparent. The pond is characterized by high phosphorus and bacterial levels, low D.O. near sediments and heavy growth of macrophytes near perimeter. High algal counts and a highly turbid water are also present.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are threatened due to organic enrichment.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3.1 m	10 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	5.7 ha	14 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Groundwater and an intermittent tributary.

Major Outflows: Groundwater - outlet has been closed off with a large dike.

LAKE WATERSHED:

Area: 0.62 km^2/0.24 $mi.^2$

Topography: Eastern side has gently rolling hills, southern side has a large gravel pit and western shore has a large wetland area.

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	N/A

PONTOOSUC LAKE, PITTSFIELD/LANESBOROUGH

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

High spring nutrient loading with an anoxic hypolimnion during the summer. Aquatic macrophytes are very dense, however, phytoplankton abundance is "low" to "normal."

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impacted by dense aquatic macrophytes.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	10.7 m	35 ft.
Mean Depth:	4.3 m	14 ft.
Maximum Length:	2,454 m	8,050 ft.
Maximum Width:	1,463 m	4,800 ft.
Surface Area:	1.89×10^6 m^2	467 acres
Volume:	8.06×10^6 m^3	6,532 acre/ft.
Shoreline Length:	7,742 m	25,400 ft.
Development of Shoreline:	1.59	

Major Inflows: Northewest inlet - Secum Brook
North inlet
Northeast inlet - Town Brook
East inlet

Major Outflows: West Branch Housatonic River

LAKE WATERSHED:

Area: N/A

Topography: Rolling hills and mountains

Major Soil Types: Taconic-Macomber association
Rock outcrop - Pittsfield complex
Lenox silt loam
Amenia silt loam
Pittsfield very stony fine sandy loam
Hero fine sandy loam

Land Use:	% of Total:
Primarily wooded	N/A
Agriculture - both pasture and tilled	
Urban	

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Agricultural	Manure storage facilities
Urban runoff	Watershed Management Plan and catch basins
Septic tanks	Watershed Management Plan and catch basins and sewers

PORTER LAKE, SPRINGFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Characterized by high nitrogen, phosphorus and solids, very dense growths of macrophytes in the littoral zones, high phytoplankton populations and low transparency.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Boating, fishing and passive uses are all highly impaired due to siltation and nutrients.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3.0 m	10 ft.
Mean Depth:	1.3 m	4.2 ft.
Maximum Length:	996 m	3,267 ft.
Maximum Width:	279.5 m	917 ft.
Surface Area:	11 ha	27.3 acres
Volume:	142,590 m^3	115.6 acre/ft.
Shoreline Length:	2,670 m	8,760 ft.
Development of Shoreline:	2.26	

Major Inflows: Entry Dingle Brook and Pecousic Brook join to form the major inlet. Three other intermittent tributaries also feed the lake.

Major Outflows: Pecousic Brook flows west to the Connecticut River.

LAKE WATERSHED:

Area: 20.8 km^2

Topography: Tributary valley to the Connecticut River, slopes in the immediate vicinity of the lake are extremely steep where erosion has occurred. Further back the topography is flatter, and more terrace-like.

Major Soil Types: Windsor, Hinckley

Land Use:	% of Total:
Residential	74.5
Open space	17.0
Commercial	6.0
Industrial	2.5

POINT SOURCES:

Source	Controls in Place
Storm drains	Rerouting of some in the immediate watershed.

NONPOINT SOURCES:

Source	Controls in Place
Range land (zoo animals)	Zoo relocated
Streambank destabilization	Redesign and construction of stormwater systems, bank stabilization.

PRINDLE POND, CHARLTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

This pond is classified as mesotrophic. The primary problem is dense macrophyte growth.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, swimming and boating are all impaired by dense macrophytes.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.5 m	5 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	28.7 ha	71 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: None

Major Outflows: One on northwest shoreline

LAKE WATERSHED:

Area: N/A

Topography: Hilly

Major Soil Types: N/A

Land Use:	% of Total:
Forest	N/A
Agricultural	

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Agriculture	N/A
Septic systems	
Surface runoff	

PUFFER'S POND, AMHERST

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is excellent, but in excess of 8 x 10^4 m^3 (1 x 10^5 $yd.^3$) of silt/sand has accumulated on the pond bottom due to the large ratio (902:1) of watershed to lake area.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

The pond is heavily used for swimming and fishing. Diminished pond volume due to natural erosion does threaten these activities.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3.2 m	10.5 ft.
Mean Depth:	1.7 m	5.5 ft.
Maximum Length:	366 m	1,200 ft.
Maximum Width:	275 m	900 ft.
Surface Area:	4.45 x 10^4 m^2	11 acres
Volume:	7.4 x 10^4 m^3	60 acre/ft.
Shoreline Length:	1,280 m	4,200 ft.
Development of Shoreline:	2.0	

Major Inflows: Cushman Brook

Major Outflows: Factory Hollow Dam (spillway)

LAKE WATERSHED:

Area: 40 km^2 (15.5 $mi.^2$)

Topography: Hilly with steep gradients. Elevation ranges from a maximum of 396 m (1,300 ft.) in Pelham Hills area to 68 m (223 ft.) at top of Pond Dam.

Major Soil Types: Sandy glacial till and sandy/loamy; Gloucester-Montauk-Paxton; Hinckley-Merrimack-Windsor; Hinckley-Merrimac; Shapleigh-Essex-Goucester

Land Use:	% of Total:
Open land	5.0
Forested	77.0
Agricultural	3.0
Light density residential	15.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Forested watershed (natural erosion of sediments)	Sedimentation basin to be constructed in 1988

QUABOAG POND, BROOKFIELD/EAST BROOKFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality due to high organic input from the watershed, and enriched bottom sediments which contribute to macrophyte growth. High turbidity and color, and algal blooms are also apparent.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing impaired due to organic enrichment.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3.66 m	12 ft.
Mean Depth:	2.05 m	6.7 ft.
Maximum Length:	2.29 km	1.42 mi.
Maximum Width:	1.61 km	1 mi.
Surface Area:	2.17 km^2	537 acres
Volume:	4.45 million m^3	3,606 acre/ft.
Shoreline Length:	8.11 km	5.04 mi.
Development of Shoreline:	1.55	

Major Inflows: East Brookfield River and Quacumquasit Pond

Major Outflows: Quaboag River

LAKE WATERSHED:

Area: 199 km^2/49,063 acres

Topography: Land slopes are highly variable. Tending to be slight in the immediate North Pond area and steeper at the periphery of the watershed.

Major Soil Types: Hinckley-Merrimac-Windsor

Land Use:	% of Total:
Forest	71.8
Residential	7.9
Wetland	0.8
Agriculture	10.3
Water	3.4
Other	5.8

POINT SOURCES:

Source	Controls in Place
Municipal STP	Upgrading

NONPOINT SOURCES:

Source	Controls in Place
Agricultural dairy feedlots	None yet
Septic systems	

QUACUMQUASIT POND, BROOKFIELD/EAST BROOKFIELD/STURBRIDGE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is fairly good in this mesotrophic pond. It is a deep pond with hypolimnetic anoxia and some macrophyte growth.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, swimming and boating are main recreational uses of the pond. Fishing is threatened due to organic enrichment and low D.O.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	24.4 m	80 ft.
Mean Depth:	9.91 m	32.5 ft.
Maximum Length:	1.95 km	1.21 mi.
Maximum Width:	0.76 km	0.47 mi.
Surface Area:	0.88 km^2	218 acres
Volume:	8.74 million m^3	7,085 acre/ft.
Shoreline Length:	5.40 km	3.35 mi.
Development of Shoreline:	1.62	

Major Inflows: Groundwater and Quaboag Pond water during flow reversals

Major Outflows: To Quaboag Pond

LAKE WATERSHED:

Area: 4.4 km^2/1080 acres.

Topography: Forested and steep sloped hills

Major Soil Types: Charlton-Hollis-Paxton

Land Use:	% of Total:
Forest	83.3
Residential	14.4
Wetland	2.3

POINT SOURCES:

Source	Controls in Place
Flow reversals from Quaboag Pond	None yet

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	None yet

LAKE QUANNAPOWITT, WAKEFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is poor due to high nutrient levels resulting in weed and algal growth. Also, water clarity is poor due to high wind and wave action stirring up sediments.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impaired at times there is moderate to high impairment in some areas of the lake due to high nutrient input and wind/wave action.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3.4 m	11.3 ft.
Mean Depth:	1.9 m	6.3 ft.
Maximum Length:	1,792 m	5,880 ft.
Maximum Width:	878 m	2,880 ft.
Surface Area:	101 ha	250 acres
Volume:	$1{,}724 \times 10^6$ m^3	1,397 acre/ft.
Shoreline Length:	4,791 m	15,720 ft.
Development of Shoreline:	1.34	

Major Inflows: Two basic inflows. One is the main inlet culvert on western shore, (drains 150 ha/371 acres of the watershed). The remaining 152 ha/376 acres drains to the lake via storm sewers.

Major Outflows: Outlet structure exists on northeastern shore of the lake.

LAKE WATERSHED:

Area: 302 hectares/747 acres

Topography: The watershed is a result of glacial erosion and deposition. It consists of drift and swamp deposits.

Major Soil Types: N/A

Land Use:	% of Total:
Wetland	8.0
Residential (moderate density)	36.0
Residential (sparse density)	28.0
Commercial	3.0
Forested	5.0
Open space	7.0
Recreational	8.0
Transportation	5.0

POINT SOURCES:

Source	Controls in Place
Auto dealership (a suspected point source)	Presently, none; anticipated, filter berm

NONPOINT SOURCES:

Source	Controls in Place
Watershed runoff	Presently none; anticipated, filter
Internal loading	berm and weed harvesting

QUEEN LAKE, PHILLIPSTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Classified as oligotrophic. Characterized by good D.O. levels, high clarity, low nutrients, and few macrophytes or algae.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, swimming and boating are threatened due to development in the watershed.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	6.7 m	22 ft.
Mean Depth:	4.6 m	15 ft.
Maximum Length:	1,751 m	5,744 ft.
Maximum Width:	477 m	1,564 ft.
Surface Area:	54 ha	134 acres
Volume:	2,484,232 m^3	2,014 acre/ft.
Shoreline Length:	4,953 m	16,250 ft.
Development of Shoreline:	1.89	

Major Inflows: Spring

Major Outflows: Unnamed surface outlet .

LAKE WATERSHED:

Area: 435 acres

Topography: Low hills seperated by wetland areas.

Major Soil Types: Paxton-Hillis-Canton; Hinckley-Windsor-Muck; Scituate-Essex-Ridgebury

Land Use:	% of Total:
Forest	79.0
Urban	17.0
Wetlands	3.0
Open	1.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

LAKE QUINSIGAMOND, WORCESTER/SHREWSBURY

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

The lake is classified as mesotrophic due to a low dissolved oxygen content in the hypolimnion and high nutrient loadings from urban runoff.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impaired due to urban runoff which includes high levels of nutrients and bacteria.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	27.4 m	90 ft.
Mean Depth:	10 m	33 ft.
Maximum Length:	8.04 km	5 mi.
Maximum Width:	1,158 m	3,800 ft.
Surface Area:	192 ha	475 acres
Volume:	19.2 x 10^6 m^3	15,611 acre/ft.
Shoreline Length:	17,068 m	56,000 ft.
Development of Shoreline:	3.47	

Major Inflows:
- Fitzgerald Brook
- Coalmine Brook
- Poor Farm Brook
- Inlet from Newton Pond
- Billings Brook
- O'Hara Brook
- Tilly Brook
- Inlet from Jordan Pond
- Medical School drain
- Belmont Street drain

Major Outflows: Flows to Flint Pond and subsequently continues as the Quinsigamond River.

LAKE WATERSHED:

Area: 20.84 sq. mi.

Topography: Strong topological variation with elevations increasing to the north and west. Steep hills dot the upland divide on all sides of the basin.

Major Soil Types: Paxton, Hillis, Canton

Land Use:	% of Total:
Residential	27.0
Commercial	6.0
Industrial	5.0
Park/forest	40.0
Open	10.0
Water	11.0

POINT SOURCES:

Source	Controls in Place
Combined sewer overflows	Numerous inspection programs in place to identify and correct problems.

NONPOINT SOURCES:

Source	Controls in Place
Urban runoff through storm sewers Sedimentation Surface runoff	Inspection programs have been instituted to identify problem areas.

RED BRIDGE IMPOUNDMENT, LUDLOW/WILBRAHAM/PALMER

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Eutrophic impoundment (run-of-the-river) as witnessed by high nutrient concentrations, phytoplankton blooms, hypolimnetic anoxia, low transparency, and dense macrophyte growths.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, boating and swimming threatened by nutrients, pathogens (potential), toxicity (potential), and siltation.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	13.7 m	45 ft.
Mean Depth:	6.4 m	21.1 ft.
Maximum Length:	1.64 km	1.02 mi.
Maximum Width:	0.40 km	0.25 mi.
Surface Area:	34 ha	83 acres
Volume:	2.158×10^6 m^3	1,750 acre/ft.
Shoreline Length:	3.9 km	2.4 mi.
Development of Shoreline:	1.88	

Major Inflows: Chicopee River

Major Outflows: Chicopee River

LAKE WATERSHED:

Area: N/A

Topography: Rugged and hilly with narrow, steep sided valley streams.

Major Soil Types: Hinckley and Merrimac (sand, gravelly) in valleys; Paxton, Canton, Charlton (loamy) in uplands.

Land Use:	% of Total:
Forest	66.0
Wetlands	7.0
Residential	5.0
Agriculture, Open land, Recreational	22.0

POINT SOURCES:

Source	Controls in Place
Municipal treatment plant (upstream from the pond)	Secondary treatment plant
Industrial	Varied

NONPOINT SOURCES:

Source	Controls in Place
Pasture land	None

RED LILY POND, BARNSTABLE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

High bacteria counts and excessive nutrient loading (phosphorus and nitrogen) are evident.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing impaired because of excessive weed growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.28 m	4.2 ft.
Mean Depth:	0.79 m	2.6 ft.
Maximum Length:	747 m	2,450 ft.
Maximum Width:	191 m	625 ft.
Surface Area:	5.37 ha	13.26 acres
Volume:	42.9×10^3 m^3	34 acre/ft.
Shoreline Length:	2,156 m	7,025 ft.
Development of Shoreline:	2.6	

Major Inflows: Mosiquito control ditch

Major Outflows: Centerville River

LAKE WATERSHED:

Area: 7.7×10^5 m^2 or 8.3×10^6 $ft.^2$

Topography: Some hills with wetland areas

Major Soil Types: Hinckley sand, Merrimac sandy loam

Land Use:	% of Total:
Residential	80.0
Wetlands	20.0

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	Construction of cluster septic system is anticipated.
Stormwater runoff	Improved drainage and alteration of mosquito ditch is anticipated.

RICHMOND POND, RICHMOND/PITTSFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Classified as mesotrophic. This is a hard water, alkaline lake with extensive growth of pondweed, milfoil and stonewort.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, boating and swimming are impaired by dense weed growths in shallow areas.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	16 m	52 ft.
Mean Depth:	5.4 m	18 ft.
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	88 ha	218 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Mt. Lebanon Brook
Scace Brook
North Branch
Unnamed southern tributary
Unnamed eastern tributary
Unnamed southeastern tributary

Major Outflows: Outlet to southwest branch, Housatonic River

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
Agricultural	7.3
Commercial	1.0
Forested	62.5
Cemetery	0.1
Residential	15.0
Open	3.6
Parks/camps	1.0
Railroad	0.3
Wetlands	9.2

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

LAKE RIPPLE, GRAFTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality due to weed and algal growth which is a result of excessive nutrient input via the Quinsigamond River watershed.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming is severely impaired due to macrophytes. Boating and fishing are moderately impaired due to macrophyte growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum-Depth:	2.4 m	8 ft.
Mean Depth:	1.2 m	4.1 ft.
Maximum Length:	753 m	2,470 ft.
Maximum Width:	380 m	1,250 ft.
Surface Area:	26 ha	63 acres
Volume:	0.32×10^6 m^3	259 acre/ft.
Shoreline Length:	3,526 m	11,600 ft.
Development of Shoreline:	1.98	

Major Inflows: Quinsigamond River, minor flow (comparatively) from Axtell Brook (enters from northeastern shore)

Major Outflows: Quinsigamond River

LAKE WATERSHED:

Area: 8,945 ha/22,000 acres

Topography: The watershed is generally irregularly contoured and variably-sloping throughout. There are numerous ponds and wetland areas.

Major Soil Types: Two major soil associations:
Paxton-Hollis-Canton
Hinckley-Windsor-Muck

Land Use:	% of Total:
Agriculture	0.92
Non-developed	73.35
Residential	17.17
Industrial	7.83
Commercial	0.73

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Watershed runoff	Presently, none; anticipated, dredging eastern cove.

SALISBURY POND, WORCESTER

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

High bacteria and phosphorus concentrations are present. High turbidity and low water transparency are also evident.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Poor aesthetics due to surface scums and odors caused by high bacterial, nutrient and sediment loadings.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	2.2 m	7.2 ft.
Mean Depth:	0.96 m	3.1 ft.
Maximum Length:	420 m	1,380 ft.
Maximum Width:	190 m	623 ft.
Surface Area:	6.1 ha	15.1 acres
Volume:	58,500 m^3	47 acre/ft.
Shoreline Length:	1,880 m	6,170 ft.
Development of Shoreline:	2.15	

Major Inflows: Inlet from Indian Lake
Stormdrain

Major Outflows: Outlet located at eastern end of pond

LAKE WATERSHED:

Area: 1,820 hectares/4,500 acres

Topography: Hilly with wetlands at inlet of pond.

Major Soil Types: Paxton, Urban/Udorthent/Hinckley, Canton, Woodbridge, Ridgebury

Land Use:	% of Total:
Forest	16.6
Commercial	3.5
Industrial	12.5
Parks	2.6
Residential	59.4
Wetlands	0.5
Water	4.8

POINT SOURCES:

Source	Controls in Place
Municipal pump station	Study is presently underway to determine problems at the pump station.

NONPOINT SOURCES:

Source	Controls in Place
Urban runoff	Anticipated diversion of stormwater around pond.
Erosion from construction activities	Anticipated implementation of public education and enforcement program.

SANTUIT POND, MASHPEE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is poor. High nutrient levels, low transparency, high algal counts and dense macrophyte growths are major problems in the pond.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fish and swimmming are impaired by dense growth of macrophytes and algae. Boating is impaired in shallower areas by dense macrophyte growths.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3 m	10 ft.
Mean Depth:	1.2 m	4.2 ft.
Maximum Length:	1,829 m	6,000 ft.
Maximum Width:	564 m	1,850 ft.
Surface Area:	69.5 ha	172 acres
Volume:	870,974 m^3	706.1 acre/ft.
Shoreline Length:	5,060 m	16,600 ft.
Development of Shoreline:	1.7	

Major Inflows: Seepage lake

Major Outflows: South end of lake

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Agricultural fertilizers (cranberry bogs)	None
Residential septic systems	None

SCARBORO POND, BOSTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is poor. This pond is eutrophic with high levels of phosphorus and total solids in the water. The pond is severely affected by siltation which has lead to a heavy infestation of macrophytes.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing is severely restricted by excessive macrophyte growth, poor water quality and water level problems.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.8 m	5.9 ft.
Mean Depth:	1.1 m	3.6 ft.
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	2.9 ha	7.1 acres
Volume:	35,600 m^3	29 acre/ft.
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: East end of pond

Major Outflows: West end of pond

LAKE WATERSHED:

Area: 115.8 ha/286 acres

Topography: Small gently rolling hills with a golf course located just north of the pond.

Major Soil Types: Clay, loam, rock outcrops

Land Use:	% of Total:
Park	45.0
Zoo	25.0
Golf course	30.0

POINT SOURCES:

Source	Controls in Place
Storm drains	None

NONPOINT SOURCES:

Source	Controls in Place
Non-agricultural fertilizer	None
Surface runoff from roads	None

SHALLOW POND, BARNSTABLE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Characterized by high nutrient levels. During winter conditions the pH is between 5.0 to 6.0 with an alkalinity less than 1.0.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impaired by dense aquatic growths.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.8 m	6 ft.
Mean Depth:	0.8 m	2.7 ft.
Maximum Length:	960 m	3,150 ft.
Maximum Width:	610 m	2,000 ft.
Surface Area:	30.6 ha	75.8 acres
Volume:	255,334 m^3	207 acre/ft.
Shoreline Length:	3,048 m	10,000 ft.
Development of Shoreline:	1.5	

Major Inflows: Groundwater

Major Outflows: None

LAKE WATERSHED:

Area: 33.9 ha/84 acres

Topography: N/A

Major Soil Types: Plymouth, Merrimac, Hinckley

Land Use:	% of Total:
Residential	N/A
Forest	

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	Diagnostic/Feasibility Study currently underway.
Runoff	

SHEEP POND, BREWSTER

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Classified as an oligotrophic lake. Problems exist with low acidity. There is concern over liming effects and increased development in watershed.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing - fishing impaired by low pH.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	18 m	60 ft.
Mean Depth:	9 m	29 ft.
Maximum Length:	1,463 m	4,800 ft.
Maximum Width:	640 m	2,100 ft.
Surface Area:	55.8 ha	138.1 acres
Volume:	5,026,512 m^3	4,075 acre/ft.
Shoreline Length:	3,718 m	12,200 ft.
Development of Shoreline:	1.4	

Major Inflows: None

Major Outflows: None

LAKE WATERSHED:

Area: None

Topography: Predominantly wooded with open sandy areas in northeast and southeast corners of lake.

Major Soil Types: N/A

Land Use:	% of Total:
Primarily wooded	N/A
Light residential	

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	N/A
Surface runoff	

LAKE SHIRLEY, LUNENBURG

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

The nutrient loading to Lake Shirley is moderate and the inlake nutrient levels are low. Milfoil (Myriophyllum) and fanwort (Cabomba) are abundant.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are becoming more difficult because of the dense growth of aquatic plants. Milfoil, fanwort and water celery are extremely dense throughout the lake, except in the deepest portion where light does not penetrate. Gentle slopes, good transparency, and nutrient rich sediments flooded during the creation of the lake are highly favorable for plant growth. The highly developed shoreline promotes 100% plant coverage in cove areas.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	11.6 m	38.1 ft.
Mean Depth:	2.2 m	7.2 ft.
Maximum Length:	2,371 m	7,780 ft.
Maximum Width:	1,323 m	4,340 ft.
Surface Area:	143 ha	354 acres
Volume:	3,157,595 m^3	2,560 acre/ft.
Shoreline Length:	16,190 m	10.06 mi.
Development of Shoreline:	3.82	

Major Inflows: Easter Brook, Catacoonamug Brook, unnamed tributary from wetlands in northeast section, and unnamed tributary in southwestern section from gravel pits.

Major Outflows: Catacoonamug Brook

LAKE WATERSHED:

Area: 3,706 ha/14.3 sq. mi.

Topography: Generally hilly terrain with interspersed wetlands, streams and upstream ponds and lakes.

Major Soil Types: Paxton and Quonset - Quonset predominant along the shoreline of the lake.

Land Use:	% of Total:
Single family dwellings	7.0
Undeveloped woodland	73.0
Recreational	1.0
Commercial	6.0
Wetlands	12.0
Agriculture	1.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

SILVER LAKE, WILMINGTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Fairly good water quality is present. The lake is characterized by moderate phosphorus, low bacterial counts, and good water clarity.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	7.9 m	26 ft.
Mean Depth:	--	--
Maximum Length:	400 m	1,312 ft.
Maximum Width:	400 m	1,312 ft.
Surface Area:	11.5 ha	28.5 acres
Volume:	--	--
Shoreline Length:	1,220 m	4,000 ft.
Development of Shoreline:	1.01	

Major Inflows: Groundwater and unnamed intermittent tributary.

Major Outflows: Groundwater, unnamed intermittent outlet.

LAKE WATERSHED:

Area: 53.5 ha/132.2 acres

Topography: Fairly flat area around ponds. Outlying areas are marshy.

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	Sewering around pond

SINGLETARY POND, SUTTON/MILLBURY

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

This lake has been classified as mesotrophic based on low hypolimnetic dissolved oxygen and high total phosphorus values.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impaired by occasional algae blooms.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	9.1 m	30 ft.
Mean Depth:	7.6 m	25 ft.
Maximum Length:	1,859 m	6,100 ft.
Maximum Width:	1,646 m	5,400 ft.
Surface Area:	132 ha	327 acres
Volume:	1.0×10^6 m^3	8,259 acre/ft.
Shoreline Length:	8,168 m	26,800 ft.
Development of Shoreline:	2.0	

Major Inflows: Inlet in east cove
Inlet in south bay
Inlet on west shore
Storm drain in northwest section

Major Outflows: Singletary Brook out of north end of lake.

LAKE WATERSHED:

Area: N/A

Topography: Hilly

Major Soil Types: N/A

Land Use:	% of Total:
Residential Forest	N/A

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Septic systems Road runoff	Diagnostic/Feasibility Study presently underway.

SLUICE POND, LYNN

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Classified as eutrophic/mesotrophic as a result of high nutrient loading and stormwater runoff.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, boating, and swimming are impaired as a result of algal blooms and bacteria levels resulting from nutrient loading and stormwater.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	18 m	59 ft.
Mean Depth:	6.4 m	21 ft.
Maximum Length:	1,037 m	3,400 ft.
Maximum Width:	299 m	980 ft.
Surface Area:	15.8 ha	39 acres
Volume:	1,015,305 m^3	823.6 acre/ft.
Shoreline Length:	3,328 m	10,920 ft.
Development of Shoreline:	2.36	

Major Inflows: Unnamed surface stream (Flax Pond outlet).

Major Outflows: Unnamed surface stream
Groundwater

LAKE WATERSHED:

Area: 84.14 acres

Topography: Low hills and wetland areas

Major Soil Types: Hinckley, Merrimac, Canton, Paxton, Hollis

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
Urban runoff (storm drains and inlet)	N/A

NONPOINT SOURCES:

Source	Controls in Place
Urban runoff (overland)	N/A

SPY POND, ARLINGTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality due to heavy weed and algal growth. The excessive growth is due to nutrient influx from storm drain runoff.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are all moderately impaired due to weeds and algae.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	11.5 m	38 ft.
Mean Depth:	4.4 m	14 ft.
Maximum Length:	1,128 m	3,700 ft.
Maximum Width:	792 m	2,600 ft.
Surface Area:	41.3 ha	102 acres
Volume:	1,795 x 10^3 m^3	1,455 acre/ft.
Shoreline Length:	3,505 m	11,600 ft.
Development of Shoreline:	1.54	

Major Inflows: Culvert from Route 2 located at the southwestern border of the pond. Also, there are over 40 storm drains around the perimeter that empty into the pond.

Major Outflows: Culvert at the southeastern border of the pond.

LAKE WATERSHED:

Area: 350 ha/864 acres

Topography: Area has rather steep hills to the west-northwest and somewhat flat terrain to the east-southeast.

Major Soil Types: Paxton soils, Canton soils, Hollis soils

Land Use:	% of Total:
Residential/commercial	96.59
Open/public	3.41

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Storm drains (collecting watershed runoff)	Presently, none; anticipated, Route 2 inlet diversion, increased circulation.

STETSON POND, PEMBROKE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Mesotrophic/oligotrophic pond with high phosphorus concentrations and dense growth of aquatic macrophytes in shoreline areas.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impaired by dense weed growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	10 m	33 ft.
Mean Depth:	4.5 m	15 ft.
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	37 ha	93 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Cranberry bogs

Major Outflows: Stetson Brook to Chaffin Reservoir

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

STOCKBRIDGE BOWL, STOCKBRIDGE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Nitrogen and phosphorus are abundant, the hypolimnion is anoxic during summer stratification, and aquatic macrophytes have inundated much of the lottoral zone. Stockbridge Bowl is a eutrophic body of water.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, fishing, boating and water skiing are all impaired as a consequence of the extensive and dense growth of aquatic macrophytes, particularly Eurasian milfoil.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	14.8 m	48.6 ft.
Mean Depth:	7.1 m	23.3 ft.
Maximum Length:	2,006 m	6.6×10^3 ft.
Maximum Width:	774 m	2.5×10^3 ft.
Surface Area:	1.55×10^6 m^2	383 acres
Volume:	11×10^6 m^3	8,917 acre/ft.
Shoreline Length:	9×10^3 m	29.5×10^3 ft.
Development of Shoreline:	2.03	

Major Inflows: N/A

Major Outflows: N/A

LAKE WATERSHED:

Area: 28.7×10^6 m^2/7,090 acres

Topography: N/A

Major Soil Types: Loams of limited permeability on glacial till.

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

SWEETS POND, MANSFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is good with moderately low levels of phosphorus and low fecal coliform bacteria. Shallow depth and organic rich sediments are major problems leading to a profuse macrophyte growth.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Boating and fishing are both severely impaired by weed growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.3 m	4.3 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	7.3 ha	18 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Wading River flows into pond from northwest.

Major Outflows: River exits at southeast end.

LAKE WATERSHED:

Area: N/A

Topography: Low flat terrain

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Septic systems Siltation	None

LAKE TASHMOO, TISBURY

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

A high flushing of pond occurs due to tidal influence in the main channel. Coves had high macrophyte/macro algae growth due to nutrients.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Boating, shellfishing and swimming are the main recreational uses. Macro algae and weeds may impair shellfishing.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3 m	9.84 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	104.8 ha	259 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Unnamed tributary from unnamed pond in south (fresh water).

Major Outflows: Opening to ocean - north end of pond
Inlet/outlet is tidal

LAKE WATERSHED:

Area: N/A

Topography: Gently sloping to hilly around pond

Major Soil Types: Sand, gravel

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Road runoff Septic leachate	N/A

TISBURY GREAT POND, CHILMARK/WEST TISBURY

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Tributary coliform values are high. Moderate to dense vegetative growth indicated high nutrient loading.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Shellfishing, swimming and boating are the main recreational values. Shellfishing and swimming threatened by high coliforms.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.4 m	7.87 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	312.4 ha	772 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Tiasquam River
Unnamed tributary into Muddy Cove

Major Outflows: South shore inlet/outlet (tidal) to ocean

LAKE WATERSHED:

Area: N/A

Topography: Basically flat with a few hills

Major Soil Types: Sand, gravel

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Septic leachate Road runoff	None

TURNPIKE LAKE, PLAINVILLE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Turnpike Lake is in the eutrophic stage. Nutrient sources include septic systems and storm drain input. Major biological problem is excessive macrophyte growths. Phytoplankton and bacteria counts are low.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are all threatened by dense macrophytes.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.2 m	4 ft.
Mean Depth:	0.4 m	1.5 ft.
Maximum Length:	1,040 m	3,400 ft.
Maximum Width:	655 m	2,150 ft.
Surface Area:	47 ha	115 acres
Volume:	203,900 m^3	170 acre/ft.
Shoreline Length:	6,000 m	19,800 ft.
Development of Shoreline:	2.5	

Major Inflows: Old Mill Brook

Major Outflows: Mill and Turtle Brooks, Lake Mirimichi, Wading River

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: Hardpan and lege areas present

Land Use:	% of Total:
Residential	N/A
Commerical	
Industrial	
Open space - recreational	

POINT SOURCES:

Source	Controls in Place
Storm sewers	None

NONPOINT SOURCES:

Source	Controls in Place
Surface runoff	None
Landfill	Will be investigated during upcoming Diagnostic/Feasibility Study
Septic systems	None

UPPER MYSTIC LAKE, WINCHESTER/ARLINGTON/MEDFORD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is poor. Low transparency, high ammonia values, and high suspended solids have contributed to the poor quality.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming is severely impaired by low transparency, toxic pollutants and fecal coliform bacteria. Fishing is impaired by high ammonia concentratins, low DO's and dense macrophyte growths.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	25 m	82 ft.
Mean Depth:	8.5 m	28 ft.
Maximum Length:	1,052 m	3,450 ft.
Maximum Width:	655 m	2,150 ft.
Surface Area:	67.6 ha	167 acres
Volume:	5.7 hm^3	4,650 acre/ft.
Shoreline Length:	5,303 m	17,400 ft.
Development of Shoreline:	1.02	

Major Inflows: Aberjona River enters from north

Major Outflows: Mystic River exits from southern end of major basin.

LAKE WATERSHED:

Area: Lake watershed - 2.4 $mi.^2$
Aberjona watershed above lake - 23.3 $mi.^2$

Topography: Low hilly terrain

Major Soil Types: N/A

Land Use:	% of Total:
Residential	57.0
Commercial/industrial	13.0
Open space	30.0

POINT SOURCES:

Source	Controls in Place
Storm drains	None
CSO's	N/A
Industrial	NPDES

NONPOINT SOURCES:

Source	Controls in Place
Urban surface runoff	None
Road salt	None
Industrial	N/A

VAN HORN POND (UPPER), SPRINGFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Water quality is poor due to urban runoff which contributes solids, nutrients, bacteria and metals to the pond. The result is highly turbid waters, low dissolved oxygen levels and blue-green algal growth.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, fishing and boating all impaired due to urban runoff.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	6.1 m	20 ft.
Mean Depth:	2 m	7.4 ft.
Maximum Length:	389 m	1,277 ft.
Maximum Width:	234 m	768 ft.
Surface Area:	3.6 ha	8.8 acres
Volume:	80,671 m^3	65 acre/ft.
Shoreline Length:	--	--
Development of Shoreline:	2.83	

Major Inflows: Six storm water drains

Major Outflows: Sluiceway goes to lower Van Horn Pond to Connecticut River.

LAKE WATERSHED:

Area: 109.3 ha/270 acres

Topography: Low relief urbanized area

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
Six storm drains	None
Erosion	None

NONPOINT SOURCES:

Source	Controls in Place
N/A	N/A

VENTURE POND, SPRINGFIELD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality is present due to severe aquatic plant and phytoplankton growth.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing is presently limited due to plant and algal growth.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	3 m	9 ft.
Mean Depth:	1 m	3 ft.
Maximum Length:	290 m	950 ft.
Maximum Width:	122 m	400 ft.
Surface Area:	3.2 ha	7.8 acres
Volume:	27,000 m^3	21.9 acre/ft.
Shoreline Length:	817 m	2,680 ft.
Development of Shoreline:	1.29	

Major Inflows: No tributaries observed. The pond is surrounded by six dry storm drains that may produce occasional flow.

Major Outflows: No tributaries observed.

LAKE WATERSHED:

Area: N/A

Topography: Immediate area surrounding the pond is heavily residential.

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Possible storm drain runoff	None

WALDEN POND, CONCORD

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

With the exception of the swimming beach, nutrient levels in the pond are low, placing it in the oligotrophic range. Algal counts are low and macrophytes are found in low densities in only one cove of the pond. Alkalinity was low indicating the pond may be pH sensitive.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming may be threatened by excess nutrients leading to algal blooms. Fishing may be threatened by low pH's.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	29.6 m	97 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	2.35×10^5 m^2	58 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: None

Major Outflows: None

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Atmospheric deposition of nutrients and heavy metals	None
Bank erosion by usage	Some in place
Groundwater pollution	None

WALKER POND, STURBRIDGE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

This water body experiences extensive, dense growths of aquatic vascular plants, particularly Myriophyllum. Walker Pond is mesotrophic, with a moderate phosphorus load. Most primary production is expressed as vascular plants versus phytoplankton.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, fishing and boating are threatened by dense macrophyte growths.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	4.94 m	16.2 ft.
Mean Depth:	2.04 m	6.7 ft.
Maximum Length:	1.40 km	0.87 mi.
Maximum Width:	0.43 km	0.27 mi
Surface Area:	0.42 km^2	103 acres
Volume:	0.86 x 10^6 m^3	690 acre/ft.
Shoreline Length:	4.73 km	2.94 mi.
Development of Shoreline:	2.07	

Major Inflows: Two tributaries to the north (West State Park)
Two tributaries to the west (intermittent)
Three tributaries to the east (springs, residential runoff, Mass. Pike runoff)

Major Outflows: Unnamed - south

LAKE WATERSHED:

Area: 9.22 km^2 (2,278 acres)

Topography: Hilly

Major Soil Types: Hollis, Merrimac, Paxton, Charlton and Woodbridge

Land Use:	% of Total:
Undeveloped forest	83.0
Wetland	9.0
Residential	5.0
Open	3.0

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Highway maintenance and runoff	None

WAUSHAKUM POND, FRAMINGHAM

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

High nutrient concentrations, low hypolimnetic dissolved oxygen, and high algal counts place this lake in the mestrophic range.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are impaired by dense growths of milfoil, elodea, and pondweed along the shoreline. Blooms of green and blue-green algae occur in the spring and summer.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	15.8 m	52 ft.
Mean Depth:	4.8 m	15.9 ft.
Maximum Length:	920 m	3,010 ft.
Maximum Width:	777 m	2,550 ft.
Surface Area:	33.2 ha	82 acres
Volume:	1,600,000 m^3	1,297 acre/ft.
Shoreline Length:	3,110 m	10,200 ft.
Development of Shoreline:	1.5	

Major Inflows: Unnamed tributary in southwest cove.

Major Outflows: Outlet eastern shore

LAKE WATERSHED:

Area: 550 ha/1,360 acres

Topography: Hilly terrain at the far reaches of the watershed with wetlands around the outlet.

Major Soil Types: Agawam-Hinckley-Windsor
Canton-Narragansett

Land Use:	% of Total:
Forest	47.0
Residential	35.0
Industrial	1.0
Institutional	3.0
Commercial	3.0
Open Land	4.0
Utilities	1.0
Water	6.0

POINT SOURCES:

Source	Controls in Place
Five storm sewers	None

NONPOINT SOURCES:

Source	Controls in Place
Land developments	None
Storm sewers	None
Surface runoff	None
On-site wastewater	None
Highway maintenance and runoff	None

WEBSTER LAKE, WEBSTER

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Classified as mesotrophic, but exhibiting symptoms of eutrophy.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, fishing and boating are the major recreational uses. Swimming is periodically impaired due to potential waterborne pathogens, indicated by high coliform counts. Siltation and nutrients have stimulated excessive growth of shore plants. Seepage of nutrients from on-site sewage disposal is principal cause of problems described above.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	12.5 m	41 ft.
Mean Depth:	4.0 m	13 ft.
Maximum Length:	3,124 m	10.25×10^3 ft.
Maximum Width:	1,890 m	6.20×10^3 ft.
Surface Area:	4.89×10^6 m^2	1,209 acres
Volume:	17.27×10^6 m^3	14×10^3 acre/ft.
Shoreline Length:	3.08×10^4 m	1.01×10^5 feet
Development of Shoreline:	3.8	

Major Inflows: Brown Brook
Mine Brook
Sucker Brook

Major Outflows: Mill Brook

LAKE WATERSHED:

Area: 6,300 acres

Topography: Broad sloping hills except east of the lake, which is steep-sided. Rugged bedrock outcrops and poorly drained lowlands also typify the topography.

Major Soil Types: Glacial outwash soils including the Canton, Hinckley and Merrimac series. Isolated locations of Peat and Muck as well.

Land Use: (As of 1975)	% of Total:
Forest	70.0
Pasture	6.0
Cropland	0.3
Urban	17.6
Other	6.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
On-site wastewater systems surface runoff	None
Surface runoff	None

WEDGE POND, WINCHESTER

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Poor water quality. High nutrient levels have lead to seasonal algae blooms. Fecal coliform bacterial levels are consistently high.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming is severely impaired by high bacterial counts and poor transparency.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	5 m	18 ft.
Mean Depth:	--	--
Maximum Length:	--	--
Maximum Width:	--	--
Surface Area:	8.5 ha	21 acres
Volume:	--	--
Shoreline Length:	--	--
Development of Shoreline:	--	

Major Inflows: Pond Brook flows into the northeast end.

Major Outflows: Flows out east end into Aberjona River.

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: N/A

Land Use:	% of Total:
N/A	N/A

POINT SOURCES:

Source	Controls in Place
Storm drains	None
CSO's	None

NONPOINT SOURCES:

Source	Controls in Place
Surface runoff	None

WEQUAQUET LAKE, BARNSTABLE

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Characterized by low alkalinity, pH values between 6 and 7 and high chloride concentrations.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are the main recreational values of the lake.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	9 m	31 ft.
Mean Depth:	4 m	12 ft.
Maximum Length:	2,286 m	7,500 ft.
Maximum Width:	1,371 m	4,500 ft.
Surface Area:	1,615 ha	654 acres
Volume:	8.59×10^6 m^3	6,972 acre/ft.
Shoreline Length:	11,156 m	36,600 ft.
Development of Shoreline:	2.0	

Major Inflows: Small stream to north of the lake
Groundwater

Major Outflows: Outlet on south shore flows to Long Pond

LAKE WATERSHED:

Area: N/A

Topography: N/A

Major Soil Types: Plymouth, Merrimac, Hinckley

Land Use:	% of Total:
Residential	N/A
Forest	

POINT SOURCES:

Source	Controls in Place
None	N/A

NONPOINT SOURCES:

Source	Controls in Place
Septic system	Diagnostic/Feasibility Study currently underway.
Cranberry bogs	
Road runoff	

WHITMAN'S POND, WEYMOUTH

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Meso-eutrophic due to excessive nutrient input from the major tributary. Several coves are filled in excessively and/or are choked with macrophytes.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, fishing and boating are the recreational values. They are currently threatened from watershed nutrient input and sedimentation from the main inlet and the storm drains.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	7.9 m	26 ft.
Mean Depth:	2.1 m	6.9 ft.
Maximum Length:	1,443 m	4,734 ft.
Maximum Width:	888 m	2,710 ft.
Surface Area:	72 ha.	177.9 acres
Volume:	1,537,422 m^3	1,246 acre/ft.
Shoreline Length:	9,546 km	5.9 mi.
Development of Shoreline:	3.173	

Major Inflows: Old Swamp River
Mill River

Major Outflows: Weymouth River

LAKE WATERSHED:

Area: 32.8 km

Topography: Gently rolling, scattered hills

Major Soil Types: Paxton, Hollis, Canton

Land Use:	% of Total:
Forest	48.0
Urban	36.0
Wetland	8.0
Agriculture	4.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Urban runoff	Street sweeping
Agriculture	

WILLOW POND, NORTHAMPTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Good water quality. Diagnostic studies were done, recommendations implemented, construction completed approximately two years ago. Good circulation, few weeds, light algae growth.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Pedal boating and passive recreation are the main recreational activities. No impairment has occurred since completion of restoration.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	1.85 m	5.0 ft.
Mean Depth:	0.92 m	3.0 ft.
Maximum Length:	228 m	750 ft.
Maximum Width:	137 m	450 ft.
Surface Area:	1.5 ha	3.7 acres
Volume:	15,050 m^3	12.2 acre/ft.
Shoreline Length:	1,054 m	3,460 ft.
Development of Shoreline:	2.43	

Major Inflows: Diversion channel of the Mill River enters the pond from the northwest.

Major Outflows: The same diversin channel exits from the southern end of the pond and rejoins the Mill River downstream.

LAKE WATERSHED:

Area: 126.1 km^2/48.7 $mi.^2$

Topography: The bulk of the watershed is comprised of steep forested lands with some rolling hills.

Major Soil Types: N/A

Land Use: (within the city of Northampton area = 35.7 $mi.^2$, data for entire watershed is not available)	% of Total:
Forest/agricultural	14.0
Industrial/commercial	5.0
Residential	16.0
Public/open	14.0
Water/wetlands	4.0
Unclassified	47.0

POINT SOURCES:

Source	Controls in Place
N/A	N/A

NONPOINT SOURCES:

Source	Controls in Place
Watershed runoff	Inlet modified to control flow from Mill River diversion. This controls the input of nutrients and silt.

LAKE WINTHROP, HOLLISTON

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Organic rich sediments and shallow depths contribute to the high macrophyte densities in the lake. Low levels of Dioxin have been found in the sediments and fish.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Swimming, boating and fishing are all impaired by high macrophyte densities casued by shallow lake depths and accelerated sedimentation.

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	6.1 m	20 ft.
Mean Depth:	3.0 m	9.8 ft.
Maximum Length:	1,097 m	3,600 ft.
Maximum Width:	685.8	2,250 ft.
Surface Area:	412,794 m^2	102 acres
Volume:	125.1 x 10^4 m^3	1,014 acre/ft.
Shoreline Length:	3,352.8 m	11,000 ft.
Development of Shoreline:	1.47	

Major Inflows: An unnamed major inlet enters at the southern end of the lake. Groundwater

Major Outflows: A major outflow leaves at the north end of the lake and flows into Bogastow Brook.

LAKE WATERSHED:

Area: 4.7 x 10^6 m^2/1,159 acres

Topography: Gently sloping hills and drumlins of moderate relief and extensive areas of poorly drained lowlands.

Major Soil Types: Canton - well drained fine sandy loam. Woodbridge, Muck

Land Use:	% of Total:
Water	10.0
Open	11.0
Forested	38.0
Wetlands	29.0
Residential	9.0

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Onsite wastewater systems	None
Atmospheric deposition	None

WYMAN POND, WESTMINSTER

SUMMARY OF CHEMICAL AND BIOLOGICAL DATA:

Characterized by excessive nutrient and sediment loading from watershed, occasional high bacteria levels, and excessive growths of aquatic weeds. Overall this pond is at a highly eutrophic stage.

RECREATIONAL VALUES OF THE LAKE/POND THAT MAY BE THREATENED OR IMPAIRED:

Fishing, swimming and boating are all threatened by nutrients and macrophytes

LAKE/POND CHARACTERISTICS:

	Metric	English
Maximum Depth:	4.6 m	15 ft.
Mean Depth:	1.5 m	5 ft.
Maximum Length:	1,021 m	3,350 ft.
Maximum Width:	549 m	1,800 ft.
Surface Area:	81 ha	200 acres
Volume:	1.2×10^6 m^3	1,005.6 acre/ft.
Shoreline Length:	15,240 m	50,000 ft. (9.46 miles)
Development of Shoreline:	4.77	

Major Inflows: Unnamed brook - northeast cove
Inlet from Wachusett Lake
Smith Brook
Unnamed brook - southwest

Major Outflows: Outlet - north end of pond to Sawmill Pond

LAKE WATERSHED:

Area: 4,485 acres/4.23 sq. mi.

Topography: Hilly

Major Soil Types: N/A

Land Use:	% of Total:
Forest	75.0
Residential	5.0
Agricultural	8.0
Open water	10.0

POINT SOURCES:

Source	Controls in Place
None	--

NONPOINT SOURCES:

Source	Controls in Place
Septic systems	Sewers Town water to replace wells
Surface runoff and erosion (Wachusett ski area)	Sedimentation basins Public education Harvesting and hydro-raking

MASS. EA22.2: C73/988/app. 3

COMMONWEALTH OF MASSACHUSETTS SUMMARY OF WATER QUALITY 1988

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Appendix III – Basin / Segment Information

Massachusetts Department of Environmental Quality Engineering
Kenneth Hagg, Acting Commissioner

DIVISION of WATER POLLUTION CONTROL

Thomas C. McMahon, Director

882/369

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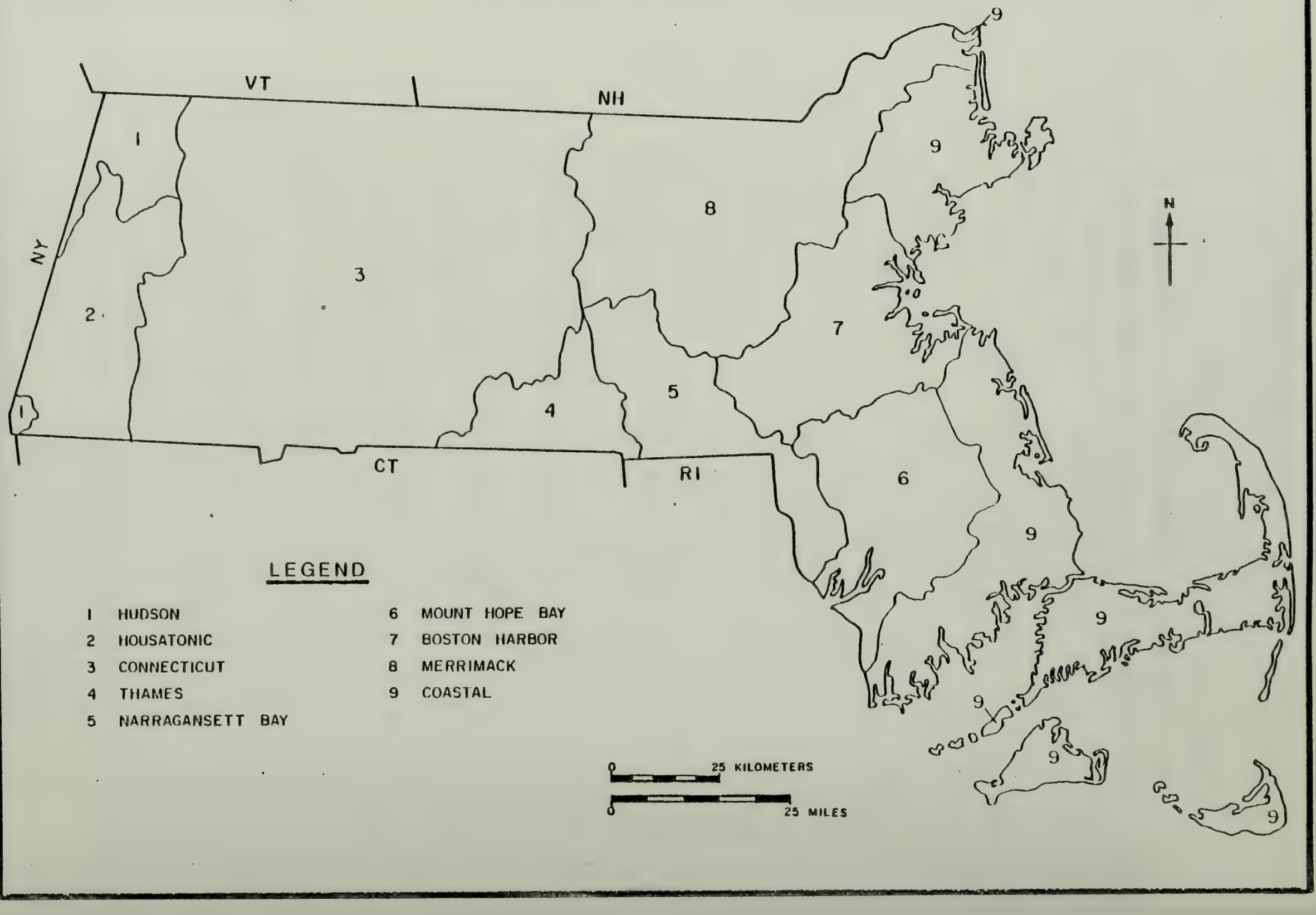
Figure 1 DRAINAGE SYSTEMS



BASIN/SEGMENT INFORMATION

Appendix III contains 32 detailed drainage basin summaries. Each synopsis contains a narrative basin description, a water quality conditions and trends description, a bibliography of up-to-date basin reports, a basin map, and a classification table of water quality segments. These summaries appear in alphabetical order with the basin order shown in Figure 2. Each classification table has seven elements that are defined below.

1. Segment Description: A description of the river segment or harbor.

2. River Miles: Inclusive mile points of the segment, where 0.0 is the mouth of the river, or the area of a harbor in square miles.

3. Water Use Classification: Freshwater rivers are classified A, B, and C; coastal or marine waters are classified SA, SB, SC. Waters are further divided into cold water fishery (CWF), seasonal cold water fishery (SCWF), warm water fishery (WWF) and aquatic life (AL). Some waters are antidegradation (AD) Provision of 314 CMR 4.04(3). See Appendix I for further criteria and definitions.

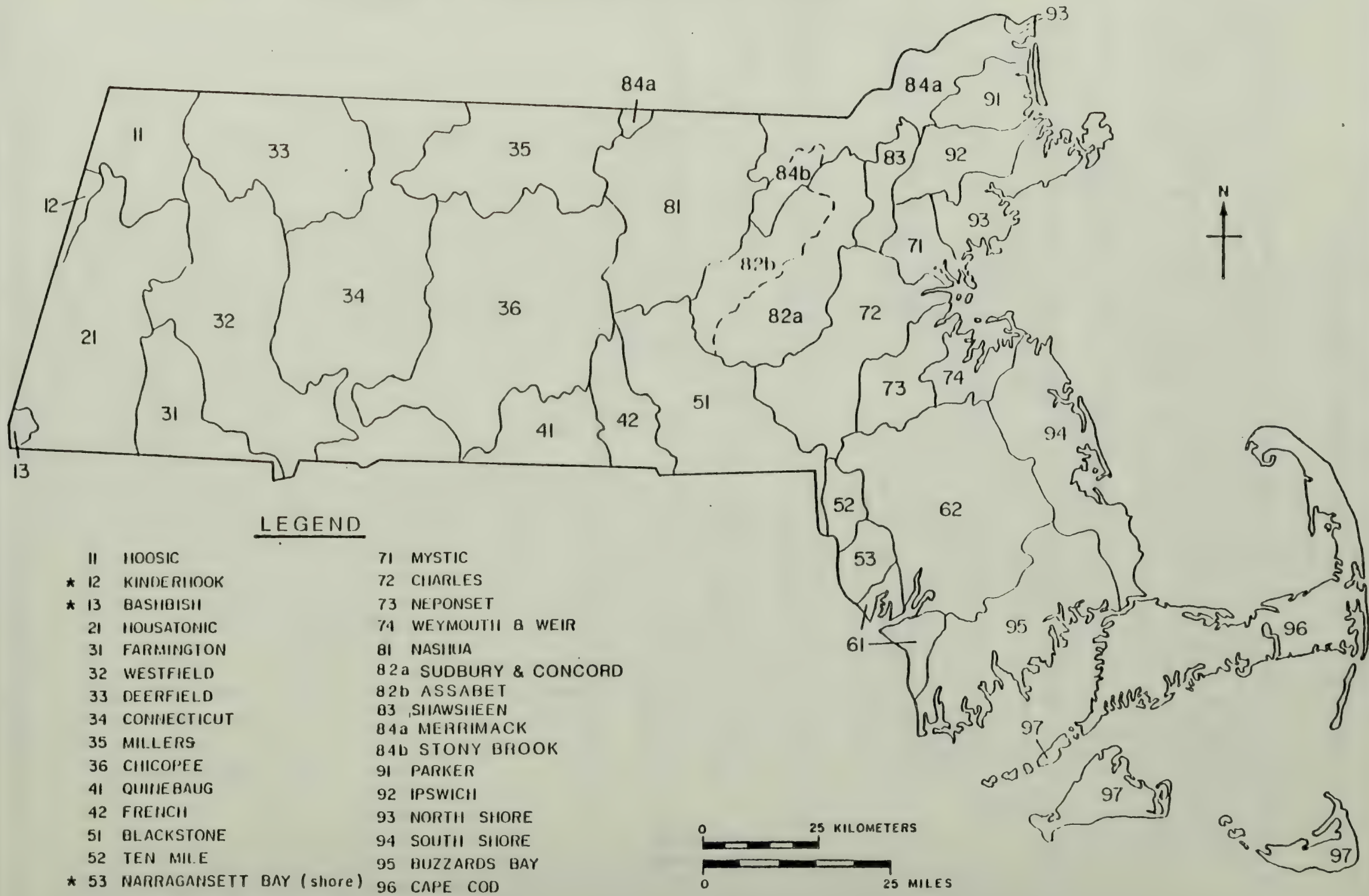
4. Support Status: An indication of the segments support (S), partial support (PS), non-support (NS), or unknown (U) water classification.

5. Water Quality Problems: Those parameters which cause a segment not to meet its designated classification, use or natural conditions.

6. Source(s) of Problems: Natural or anthropogenic inputs which cause noncompliance.

7. Abatement Needs to Meet Classification.

Figure 2 RIVER BASINS and COASTAL DRAINAGE AREAS



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* No information presented in this report.

ASSABET RIVER BASIN (82b)

Description of the Watershed

The Assabet River has its beginnings in the town of Westborough. It flows northeasterly for 31 miles through the towns of Westborough, Marlborough, Maynard, Hudson, and Concord. The Assabet drains an area of 175 square miles. It receives the discharges of four municipal wastewater treatment plants and a state prison wastewater treatment plant. Because of the number of wastewater discharges and the numerous impoundments along its course, the Assabet River does not meet class B water quality standard conditions.

The United States Geological Survey (USGS) maintains a flow gaging station in Maynard with records dating back to 1941. The average discharge at this gage over 42 years of record is 185 cubic feet per second (cfs) while the seven-day ten-year low flow is 15.1 cfs.

Water Quality Conditions and Trends

The Assabet River is slowly recovering from the impacts of years of inadequate sewage treatment. All of the river's wastewater treatment plants have either been recently upgraded, or are in the planning process for upgrading.

The former Westborough and Shrewsbury discharges are now combined through the new Westborough Regional WWTP which provides advanced secondary treatment (ammonia oxidation). Since this plant's opening in the late spring of 1987, remarkable changes have occurred in the upper Assabet. Dissolved oxygen values have improved to nearly the water quality standard, and fecal coliform bacteria and suspended solids levels have markedly decreased.

The Marlborough West WWTP will soon be upgraded to advanced secondary treatment (ammonia oxidation) and should be on-line by 1989-1990.

The Hudson WWTP has been upgraded to advanced secondary (ammonia oxidation) and operated as such for the first time during the spring of 1987. Improvements in dissolved oxygen downstream are expected.

The Maynard WWTP has been upgraded to improve its operation. It has remained a secondary plant, but has incorporated innovative technology-rotating biological contactors. This upgraded plant went on-line early in 1987.

Finally, the small discharge from the state prison, Concord MCI WWTP, will be upgraded in the next few years to accommodate expansion at the facility.

Nonpoint sources of pollutant loadings to the Assabet River include in-place sediments, urban and storm runoff. The in-place sediments are of particular interest in the upper Assabet up to the town of Marlborough, and in the Acton/Maynard area, but heavy sediment deposits are actually present throughout most of the river. These sediments can create an oxygen demand, and absorb and

release nutrients and metals, depending on such factors as river flow and pH. Since three of the Assabet's newly upgraded WWTP's just began operating during 1987, continued monitoring of the Assabet for changes in dissolved oxygen and nutrients will be important to ascertain how and if the in-place sediments will stabilize with time. Urban and stormwater runoff affect the Assabet to a small degree, apparent mainly in slightly elevated fecal coliform bacterial counts in some areas. Best management practices will be addressed in the state's Nonpoint Sources Management Plan, which is due to be published in late 1988.

The Assabet River's remaining problems, especially high nutrient concentrations, should not be minimized. During summer months the river supports a profuse aquatic weed and algae population, and this situation is expected to continue. In addition, since the Assabet is impounded and slow moving in many places, sediment oxygen demand and nutrient recycling may be a problem in areas for many more years.

Thus, recent progress toward improved water quality has occurred and further progress is expected on the Assabet River; however, continued vigilance and planning will be necessary before the Assabet River can meet all of its water quality goals.

REFERENCES

Hanley, Nora. Assabet River 1984-85 Water Quality Survey Data, Wastewater Discharge Data and Analysis. Massachusetts Division of Water Pollution Control. Westborough, Massachusetts. 1986. 76 pp.

Massachusetts Division of Water Pollution Control. 1976. Baseline Water Quality Surveys of Selected Lakes and Ponds in the Assabet River Basin 1974. Westborough, Massachusetts. 64 pp.

_____. 1979. Assabet River 1979 Water Quality Survey Data. Westborough, Massachusetts. 97 pp.

_____. 1981. The Sudbury Concord and Assabet Basin Water Quality Management Plan. Westborough, Massachusetts. 52 pp.

_____. Unpublished data. 1987

Figure 3

ASSABET RIVER BASIN (82b)

TABLE 1
ASSABET RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Outlet of flow Augmentation Pond, Westborough to Westborough WWTP, Westborough	31.0-30.0	B/AL/AD	PS	Fecal coliform bacteria	-Nonpoint sources	-Best management practices (BMP) for nonpoint sources.
Westborough WWTP to Rt. 20 dam, Northborough	30.0-26.5	B/AL	NS	D.O. Nutrients	-Westborough WWTP -In-place sediments	-The new Westborough WWTP must continue to operate satisfactorily.
				Fecal coliform bacteria	-Westborough WWTP -Urban runoff	-Sediments and water column should continue to be monitored for sediment stabilization. -BMP for nonpoint sources.
Route 20 dam to Marlborough Westerly WWTP, Marlborough	26.5-24.2	B/AL	PS	D.O. Nutrients	-Westborough WWTP -In-place sediments	-The new Westborough advanced WWTP must continue to operate satisfactorily.
Marlborough Westerly WWTP to Hudson WWTP, Hudson	24.2-16.3	B/AL	NS	D.O., Nutrients, Nickel	-Marlborough Westerly WWTP. -In-place sediments	-Upgrading of Marlborough West WWTP for increased flows and ammonia oxidation. Expected completion is in 1989.
				Fecal coliform bacteria	-Marlborough Westerly WWTP -Urban runoff	-Sediments and water column should continue to be monitored for sediment stabilization. -BMP for nonpoint sources.

TABLE 1 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Hudson WWTP to outlet of Boons Pond, Stow	16.3-12.3	B/AL	PS	D.O., Nutrients	-Hudson WWTP -In-place sediments	-The newly upgraded Hudson advanced WWTP must continue to operate satisfactorily. -BMP for nonpoint sources.
				Fecal coliform bacteria	-Hudson WWTP -Surface runoff	
Outlet of Boons Pond to before Maynard WWTP, Maynard	12.3-6.5	B/WWF	PS	Nutrients, Fecal coliform bacteria	-Upstream WWTP	-Continued proper operation of upstream WWTP.
Maynard WWTP to before Concord MCI WWTP, Concord	6.5-2.5	B/WWF	PS	D.O., Nutrients	-Maynard WWTP -In-place sediments	-The newly upgraded Maynard WWTP must continue to operate satisfactorily. -BMP for in-place sediments and runoff. -Continued water column and sediment monitoring to aid in informed decision-making.
				Fecal coliform bacteria, Lead Mercury	-Maynard WWTP -Urban runoff -Unknown	
Concord MCI WWTP to confluence with Sudbury River, Concord	2.5-0.0	B/WWF	PS	Nutrients	-Concord MCI WWTP -Upstream WWTP	-Upgrading of Concord MCI WWTP. -Continued good operation of other upstream WWTP. -BMP for nonpoint sources.
				Lead, Mercury	-Urban runoff -Unknown	

Miles Assessed: 31.0 mi
Miles Supporting Classification: 0.0 mi
Miles Partially Supporting Classification: 19.6 mi

BLACKSTONE RIVER BASIN (51)

Description of the Watershed

The Blackstone River is an interstate stream originating in Worcester, Massachusetts and flowing south approximately 45 miles to Providence, Rhode Island where it forms the headwaters of Narragansett Bay. Approximately 328 square miles are located in Massachusetts. The headwaters of the river are provided by the Kettle Brook Reservoir system located in Paxton. The Kettle Brook flowing in a southeasterly direction is joined by Beaver and Tatnuck Brooks to form the Middle River. The Middle River in turn becomes the Blackstone River at the confluence with Mill Brook in Worcester. At this point the river flows approximately 29 miles to the Massachusetts/Rhode Island border. Major tributaries downstream from Worcester that contribute flow to the river include the Quinsigamond River drainage area (37 mi^2), the West River (29.7 mi^2), the Mumford River (58 mi^2) and Mill River (35 mi^2). The total Blackstone drainage basin covers a total area of 540 square miles.

From the headwaters to the state line the river drops 1,010 feet. Over half of this drop occurs within the first 10 miles and much of the rest is taken up by many dams along the river. The U.S. Geological Survey (USGS) maintains flow gaging stations and one water quality station in the Blackstone River Basin. The gaging station in Northbridge on the Blackstone River, which drains an area of 139 square miles, had an average flow from October 1939 to September 1976 of 267 cubic feet per second. This gage was discontinued in September 1977. Another gage discontinued in September 1978 was located on Kettle Brook in Worcester. The remaining gages within Massachusetts on the Blackstone River record flows on the Quinsigamond and West Rivers and water quality on the Blackstone River in Millville, Massachusetts. The USGS also maintains a flow gage on the Blackstone River in Woonsocket, Rhode Island just over the state line. The average discharge at this gage over 51 years of record is 758 cubic feet per second and the seven-day ten-year low flow is approximately 100 cfs. The United States Army Corp of Engineers operates one flood control dam on the West River.

Water Quality Conditions and Trends

From the mid 1800's to the late 1960's and early 1970's water quality in the Blackstone River was severely degraded so that it was unfit for any uses other than power generation and waste disposal. Problems included greatly elevated coliform counts, solids and nutrients, and severely depressed dissolved oxygen concentrations. Sections of the Mumford River and Mill River were similarly degraded.

Since the late 1970's great strides have been made in pollution abatement within the Blackstone River Basin. New secondary or advanced wastewater treatment plants have been constructed in Grafton, Uxbridge, Millbury, Hopedale and Worcester. Many of the direct discharges to the river which existed in 1971 have been eliminated, a majority of which have been tied into the Upper Blackstone Water Pollution Abatement District with pretreatment.

Despite these improvements many areas of the river are still not meeting the assigned classifications. Problems start shortly downstream from the outlet of Waite Pond in Leicester. Worcester Spinning and Finishing Company operates a treatment facility to handle their textile process wastes. While their treatment is good, effluent volumes are high compared to stream flow causing color, dissolved oxygen and nutrient problems. These problems are further aggravated by untreated sanitary discharges entering Kettle Brook through storm drains throughout the Cherry Valley section of Leicester. The Cherry Valley Sewer District is presently developing a facilities plan to study and alleviate the water quality problems in this area. Water quality begins to recover and remains at its classification until it reaches Worcester where it receives stormwater runoff and combined sewer overflows from Mill Brook. The overflow from Mill Brook is scheduled to be tied into the Upper Blackstone Water Pollution Abatement District Wastewater Treatment Facility (UBWPAD-WWTF). Excess stormwater flows will be handled by a stormwater detention and chlorination plant which has been constructed, but is not yet on-line. This abatement project was initiated by the Division in 1984 to upgrade the Blackstone River from class C to class B within the segment from the Massachusetts Turnpike to Fisherville Pond, Grafton.

One of the major problems in the Blackstone River is the sheer volume of the UBWPAD-WWTF discharge. During periods of low flow in the summer months the discharge flow is close to or greater than the river flow. While the UBWPAD plant presently produces a good or "polished" secondary effluent or better, the river tends to take on the characteristics of the effluent due to volume. The major impact appears to be deoxygenation caused by large amounts of ammonia nitrogen discharged by the UBWPAD. The NPDES discharge permit requires the treatment plant to achieve nitrification or advanced wastewater treatment by 1988. Also many raw sanitary discharges in South Grafton have been tied into the Grafton Wastewater Treatment Facility. Likewise the construction of the Uxbridge WWTP has eliminated discharges in Uxbridge center including the Emile Bernat discharge.

A new area of concern is the toxicity of the sediment below Worcester. Years of waste disposal have created large deposits of sediment from Millbury to Uxbridge. Recent studies have shown these sediments to be laden with cadmium, chromium, nickel, lead, tin, and zinc. The public health impacts of this condition are not known at the present time.

For the most part all tributary streams meet their assigned classification. Minor problems on the Mumford River have improved due to the elimination of the discharge from Hayward Schuster. However a company from Maine, Guilford Industries, has purchased this facility and is presently operating at low production volumes. A new NPDES permit has been issued requiring strict water quality based effluent limitations to ensure its B classification is maintained. Water quality problems existed in the Mill River due to the outdated Hopedale WWTP. The completion of a new advanced secondary wastewater treatment facility has corrected these problems.

Many of the tributaries support a wide variety of uses. The headwaters of the Blackstone, Tatnuck and Kettle Brooks are used as the major source of Worcester's water supply. Most of the tributaries support at least warm water

fisheries and many are stocked trout waters. The West River is used extensively for fishing and also has a recreation area. The U.S. Army Corps of Engineers maintains a dam on this river for the purpose of flood control. The lower portion of the Mill River (Harris Pond) is used as an emergency water supply for the city of Woonsocket, Rhode Island.

REFERENCES

Central Massachusetts Regional Planning Commission. 1979. Area-wide Water Quality Management Plan. Worcester, Massachusetts.

Massachusetts Division of Water Pollution Control. 1978. Blackstone River 1977 Water Quality Survey Data. Westborough, Massachusetts. 70 pp.

_____. 1978. Blackstone River Basin 1977 Wastewater Discharge Survey Data. Westborough, Massachusetts. 34 pp.

_____. 1981. Blackstone River Water Quality Data 1980. Westborough, Massachusetts. 67 pp.

_____. 1981. Blackstone River Basin 1979-1980 Wastewater Discharge Survey Data. Westborough, Massachusetts. 33 pp.

_____. 1985. Blackstone River Basin, Water Quality Management Plan Update 1984. Westborough, Massachusetts. 89 pp.

_____. 1986. Blackstone River Basin Water Quality Survey Data. 1985. Westborough, Massachusetts. 75 pp.

Figure 4 BLACKSTONE RIVER BASIN (51)

TABLE 2
BLACKSTONE RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Kettle Brook from Waite Pond, Leicester to Curtis Pond, Worcester	59.3-51.3	B/WWF	NS	Color, Fecal coliform bacteria Nutrients	-Worcester Spinning and Finishing -Dry weather overflows -Septic systems	-Sewer this area to UBWPAD WWTP, Facilities Plan being developed.
Middle River, Curtis Pond to American Steel Dam, Worcester	51.3-48.8	B/WWF	PS	Solids, Fecal coliform bacteria	-Urban runoff	-Best management practices (BMP).
Blackstone River American Steel Dam, Worcester, to Fisherville Dam, Grafton	48.8-39.8	B/WWF	NS	Dissolved oxygen Solids, Fecal coliform bacteria	-Mill Brook CSOs -UBWPAD WWTP	-Construction of Mill Brook Stormwater Treatment Facility. -Diversion of sanitary overflows to UBWPAD. -Upgrading of UBWPAD to AWT by 1988.
Fisherville Dam, Grafton to Rice City Pond, Uxbridge	39.8-31.1	B/WWF	NS	Dissolved oxygen Nutrients, Algae	-UBWPAD WWTP nitrification	-Upgrading of UBWPAD to AWT by 1988.
Rice City Pond, Uxbridge to Water Quality Monitor, Millville	31.1-23.7	B/WWF	S	--	-Sediments in impoundments	--
Water Quality Monitor, Millville to Blackstone - Woonsocket, RI	23.7-20.0	B/WWF	PS	Fecal coliform bacteria, Nutrients	-Urban runoff	-Sanitary discharges have been tied into Woonsocket WWTP.

TABLE 2 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Mumford River entire length	14.5-0.0	B/SCWF/AD	S	--	--	--
West River entire entire length	8.8-0.0	B/SCWF	S	--	--	--
Mill River entire length	11.0-0.0	B/SCWF	PS	--	-Urban runoff -Hopedale WWTP	-Survey required to assess effects of plant upgrading.
Mill Brook entire length	3.0-0.0	B/AL	NS	Dissolved oxygen Solids, Fecal coliform bacteria pH, Nutrients	-CSOs	-Construction of Mill Brook Stormwater Treatment Facility. -Diversion of sanitary overflows to UBWPAD.
Beaver Brook entire length	3.0-0.0	B/WWF/AD	NS	Dissolved oxygen Solids, Fecal coliform bacteria Nutrients	-CSOs	-Best management practices (BMP).
Quinsigamond River entire length	5.3-0.0	B/WWF	S	--	--	--

Miles Assessed: 84.9 mi
Miles Supporting Classification: 36 mi
Miles Partially Supporting Classification: 17.2 mi

BOSTON HARBOR (70)

Description of the Watershed

Boston Harbor includes areas of Winthrop, Boston, Quincy, Weymouth, Hingham, and Hull. The Harbor includes Winthrop Bay, Inner Harbor, Dorchester Bay, Quincy Bay, Hingham Bay, and the Outer Harbor to a line connecting the Boston Lighthouse to Deer Island in Boston and Point Allerton in Hull. Twenty-two of 28 islands in the Harbor Islands State Park lie within the area described here - approximately 47 square miles.

Boston Harbor receives the drainage, including waste discharges of four major coastal streams - the Mystic, Charles, Neponset and the Weymouth Fore Rivers. It also receives discharges from the entire waterfront and minor tributary areas extending from Winthrop to Hull. The total flow from tributary streams averages 350 cfs during the summer. This flow is very low compared to the daily inflow of salt water during tidal flushing, which averages 320,000 cfs for a six-hour period.

Water Quality Conditions and Trends

Boston Harbor is recognized as one of the most polluted harbors in the United States. The harbor receives approximately 500 million gallons per day of primary treated wastewater from two treatment plants: Nut Island and Deer Island.

These two plants receive municipal wastewater from two million people served by Massachusetts Water Resources Authority (MWRA) sewerage system. The sludge generated from these plants is also released to the Outer Harbor during the outgoing tide. Approximately 100 combined sewer overflows also line the shore of Dorchester Bay and the Inner Harbor. Other sources of pollution are industrial waste discharges, tributary streams to the harbors, watercraft wastes, refuse contributed by barging operations, shoreline refuse dumping, and contaminated sediments.

Existing water quality and sediment data indicate some degree of noncompliance with the applicable salt water quality standards in nearly all segments of the harbor. Dissolved oxygen concentrations are often below the 6.0 mg/l standard. Elevated levels of coliform bacteria are responsible for the frequent closings of bathing beaches and shellfishing areas. Toxic pollutants in the water column and sediments are also a large concern. Water quality problems are particularly severe in the Inner Harbor and to a lesser degree, in Dorchester and Quincy Bays.

Actions currently being undertaken to abate pollution of the harbor include immediate upgrading of Deer Island and Nut Island WWTPs, construction of a secondary wastewater treatment plant by 1999, sludge treatment by 1990, separation and treatment of combined sewer overflows, and extension of the Deer Island outfall by 1995; and stricter pretreatment standards and enforcement of toxic discharges to the MWRA sewerage system.

REFERENCES

Massachusetts Division of Water Pollution Control. 1982. Boston Harbor Water Quality and Wastewater Discharge Survey Data. Westborough, Massachusetts 37 pp.

_____. 1983. Boston Harbor Water Quality and Wastewater Discharge Survey Data. Westborough, Massachusetts. 39 pp.

_____. 1984. Boston Harbor Water Quality and Wastewater Discharge Survey Data. Westborough, Massachusetts. 46 pp.

_____. 1985. Boston Harbor Water Quality and Wastewater Discharge Survey Data. Westborough, Massachusetts. 72 pp.

_____. 1986. Boston Harbor Water Quality and Wastewater Discharge Survey Data. Westborough, Massachusetts. 75 pp.

_____. 1987. Boston Harbor Water Quality and Wastewater Discharge Survey Data. Westborough, Massachusetts. Unpublished

United States Department of the Interior and Massachusetts Water Resources Commission. 1969. Joint Report on Pollution of the Navigable Waters of Boston Harbor. Boston, Massachusetts. 91 pp.

Figure 5 BOSTON HARBOR BASIN (70)

TABLE 3
BOSTON HARBOR DRAINAGE SYSTEM

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Outer Harbor (President Roads & Nantasket Roads)	23.0 mi^2	SB	PS	Fecal coliform bacteria, Metals	-Deer Island WWTP -Nut Island WWTP	-Stop sludge dumping. -Secondary treatment.
Inner Harbor Includes: (Fort Point Channel and Reserved Channel)	2.3 mi^2	SC	PS	Metals, Fecal coliform bacteria Aesthetics, Oil and grease Dissolved oxygen	-Combined sewer overflows -In-place sediments -Water traffic -Tributary pollutants	-CSO treatment.
Dorchester Bay	4.6 mi^2	SB	PS	Fecal coliform bacteria Dissolved oxygen Metals	-Combined sewer overflows -Moon Island pumping station	-CSO separation and treatment.
Quincy Bay (portion designated SA)	1.0 mi^2	SA	NS	Fecal coliform bacteria, Shellfishing and swimming restricted	-Storm drains	--
Quincy Bay (excluding portion designated SA)	4.7 mi^2	SB	PS	Fecal coliform bacteria	-Storm drain discharges -Nut Island WWTP	-Nut Island discharges tie Nut Island WWTP to Deer Island WWTP -O&M correction.

TABLE 3 (CONTINUED)

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Hingham Bay vicinity Nut Island WWTP	1.0 mi^2	SB	PS	Fecal coliform bacteria	-Storm discharges -Tributary pollutant	-O&M correction.
Hingham Bay	5.8 mi^2	SB	S	--	--	--
Hingham Harbor	1.1 mi^2	SA	NS	Fecal coliform bacteria Restricted shellfishing	-Storm drains	-O&M correction.
Hull Bay	2.3 mi^2	SB	S	--	--	--
Winthrop Bay	1.5 mi^2	SB	PS	Fecal coliform bacteria, Metals	-Combined sewer overflows	-CSO treatment.

Square Miles Assessed: 47.3 mi^2
Square Miles Supporting Classification: 8.1 mi^2
Square Miles Partially Supporting Classification: 39.2 mi^2

BUZZARDS BAY COASTAL DRAINAGE AREA (95)

Description of the Watershed

The Buzzards Bay Basin is a prominent coastal embayment on the the New England coast nestled between Cape Cod and Southern Massachusetts. The mouth of the bay opens into Rhode Island Sound. Along its western shore the drainage basin is formed by seven coastal river basins, with a total drainage area of approximately 350 square miles. From east to west the major river basins are: Agawam, Wankinco, Weweantic, Mattapoisett, Acushnet, Paskamanset/Slocum, and the Westport.

Along the easterly shore from the Cape Cod Canal to Woods Hole, small river basins provide an additional 35 square miles of drainage area. The prominent freshwater streams along the eastern shore from north to south are: Back River, Pocasset River, Wild Harbor River, and Herring Brook. A chain of islands (the Elizabeth Islands), separated by tidal channels (holes), forms the southeastern side of the bay.

Geologically, the Buzzards Bay Coastal Drainage Area is characterized as a low granitic upland with glacial till and outwash deposits forming the soils. The terrain can be described as low and gently rolling with numerous lakes and wetlands. Maximum elevations range between 200 to 300 feet (MSL) in the northern-most reaches of the basin to sea level at the coastline.

The bay itself is 28 miles long, averages eight miles in width and has an average depth of 50 feet in the Central Basin. The surface area of the bay is estimated to be 235 square miles. The numerous harbors and coves located along its jagged coastline are used extensively for recreational and commercial purposes, with over 4,300 slips and moorings along the bay. Over 20,000 vessels pass through the Cape Cod Canal and Buzzards Bay annually, transporting over 19 million tons of commercial cargo including most of the number two fuel used in New England.

New Bedford Harbor is the industrial and commercial center of the basin, carrying over from its earlier days as a principal whaling port. It is now one of the most important fishing ports in the United States, often leading the nation in terms of value of landings. This harbor also suffers the most severe water quality problems. The estuary and harbor has been designated by the United States Environmental Protection Agency as a Superfund site due to wide spread contamination of sediments and biota with heavy metals and polychlorinated biphenyls (PCBs). Concentrations of PCBs within estuarine sediments range from a few parts per million to 100,000 parts per million. The likely sources for the PCBs have been traced to two industrial operations which discharged wastewaters directly to the harbor and indirectly through the New Bedford municipal sewer system. Additional problems within the harbor include combined sewer overflows, industrial discharges, street runoff, discharges from marine vessels, municipal sewage treatment plant discharges and poor water circulation within the inner harbor.

Problems in other harbors within the basin include street runoff from urban development, discharges from failing septic systems, waste discharges from

water craft, leachate from landfills and agricultural runoff. This last source includes bacterial contamination of shellfish growing areas due to runoff from dairy and beef operations and potential impacts from the widespread use of fertilizers, pesticides and herbicides in the cranberry industry. Oil pollution from the on-shore terminals and off-shore tankers is an occasional problem which is common to the entire coastline of Buzzards Bay.

Water Quality Conditions and Trends

The most recent intensive water quality survey conducted in the basin was conducted in 1986. During that year 57 water quality stations were sampled in accordance with established sampling procedures. These stations occupied locations within the major freshwater rivers and streams, in the intertidal zones, inner embayments and the outer bay. Stations were confined to the drainage basin south of a line drawn between Mattapoisett Harbor and the mouth of the bay. Analyses were conducted on a wide range of parameters including dissolved oxygen, pH, coliform bacteria and nutrients. While data interpretations are still underway, a preliminary review indicates periodic water degradation in the form of low dissolved oxygen concentrations and elevated coliform levels. Additional bay-wide surveys were conducted on selected priority pollutants in sediments (PCBs, PAH, and total heavy metals); and in biota (quohaugs, lobsters and winter flounder). These data, while still under review, generally do not show elevated levels outside of the New Bedford area.

The studies are being conducted as part of a coordinated estuarine study of Buzzards Bay. This plan seeks to develop a cooperative approach among government regulatory agencies, research institutions and the public to identify and develop coordinated programs to address the basin's water quality problems.

Currently there are five (5) major wastewater treatment facilities in the basin. The only serious problem is with the New Bedford WWTP. This facility experiences considerable operational and hydraulic overloading problems. The city and state have a major plan underway to upgrade the facility and the collection systems. The towns of Wareham, Marion, Fairhaven and Dartmouth all have plans to upgrade or expand their respective sewage treatment facilities. With the exception of the Acushnet River and New Bedford Harbor area, industrial wastewater discharges are few in number and have little impact on the overall quality of the basin.

Overall, the water quality within the basin has shown significant decline as evidenced by the number of closures of shellfish harvesting areas from nine (9) in 1975 to 27 in 1986. It should be noted that this current report now also includes shellfish growing areas located along the Cape side of the bay. The areas had previously been reported within the Cape Cod Coastal Drainage Area. Two Superfund sites are reported to exist within the watershed, the aforementioned New Bedford Harbor Superfund site and the Resolve Inc. site. The six acre site located in the upper Westport River drainage basin contained a waste chemical reclamation facility from 1956 to 1980. Residues from the distillation process contaminated local surface and groundwater water sources with PCB's and other organic compounds. A feasibility study is currently being evaluated to determine the most effective cleanup options, or remedial alternatives.

The impact of toxic compounds outside of the New Bedford area have not been extensively evaluated. Sediment data collected outside of the New Bedford Harbor are limited to one or two stations per segment. This was not considered to be a sufficient data base to make assessments on impacts of toxic compounds in that segment. Non-conventional pollution sources, i.e., ammonia, chlorine, and phosphorus, were not assigned a level of impact since there does not exist sufficient information at this time to make such an evaluation.

Major nonpoint sources within the Buzzards Bay drainage basin are agriculture sources. The Westport River watershed appears to experience significant declines in water quality after rain events. High coliform bacteria levels in the overlying waters necessitated the closure of productive shellfish beds. A likely major contributor is the runoff from farm lands and feed lots of the dairy and beef herds located along the river and its tributaries. Another source is the potential contribution from the extensive cranberry growing industry which occupies much of the wetlands in the eastern portions of the basin.

Other sources common to many of the inner embayment and estuaries are periodic waste discharges from boats. The bay contains an estimated 4300 mooring slips. It is likely that periodic declines in water quality during the summer can be attributed to this source.

Runoff from street drains has been identified as a major contributor to water quality. Declines are due to the flushing of animal wastes, oils, heavy metals, nutrients and other contaminants during rain events. A recent study completed in Buttermilk Bay has identified street drains as the principal source of bacterial contamination. The problem which formerly extended from the urbanized areas of the basin has been expanded throughout the basin as more and more areas come under development and runoff is discharged to receiving waterbodies.

Failing septic systems are identified as a likely contributor to leachate from landfills. Individual septic systems provide waste disposal for the majority of the drainage basin. Old systems, and systems located at or close to the groundwater table or a surface waterbody are often identified as significant potential sources.

REFERENCES

Massachusetts Division of Water Pollution Control. 1972. Buzzards Bay, Outer New Bedford Harbor Special Water Quality Study 1980. Westborough, Massachusetts. 45 pp.

_____. 1977. Buzzards Bay Basin 1976 Water Quality Management Plan. Westborough, Massachusetts. 109 pp.

_____. 1975. Buzzards Bay 1975 Water Quality Survey Data. Westborough, Massachusetts. 136 pp.

_____. 1981. Baseline Water Quality Studies of Selected Lakes and Ponds in the Buzzards Bay Basin. Westborough, Massachusetts. 58 pp.

_____. 1980. White Island Pond Water Quality Study. August 1976-May 1978. Westborough, Massachusetts. 92 pp.

_____. 1987. Buzzards Bay 1985 Water Quality Survey Data, Part A. Westborough, Massachusetts. 147 pp.

_____. 1987. Buzzards Bay 1985-1986 Sediment Data Report, Westborough, Massachusetts. 75 pp.

_____. 1988. Buzzards Bay 1986 Water Quality Data. Westborough, Massachusetts. (in preparation)

Figure 6 BUZZARDS BAY BASIN (95)

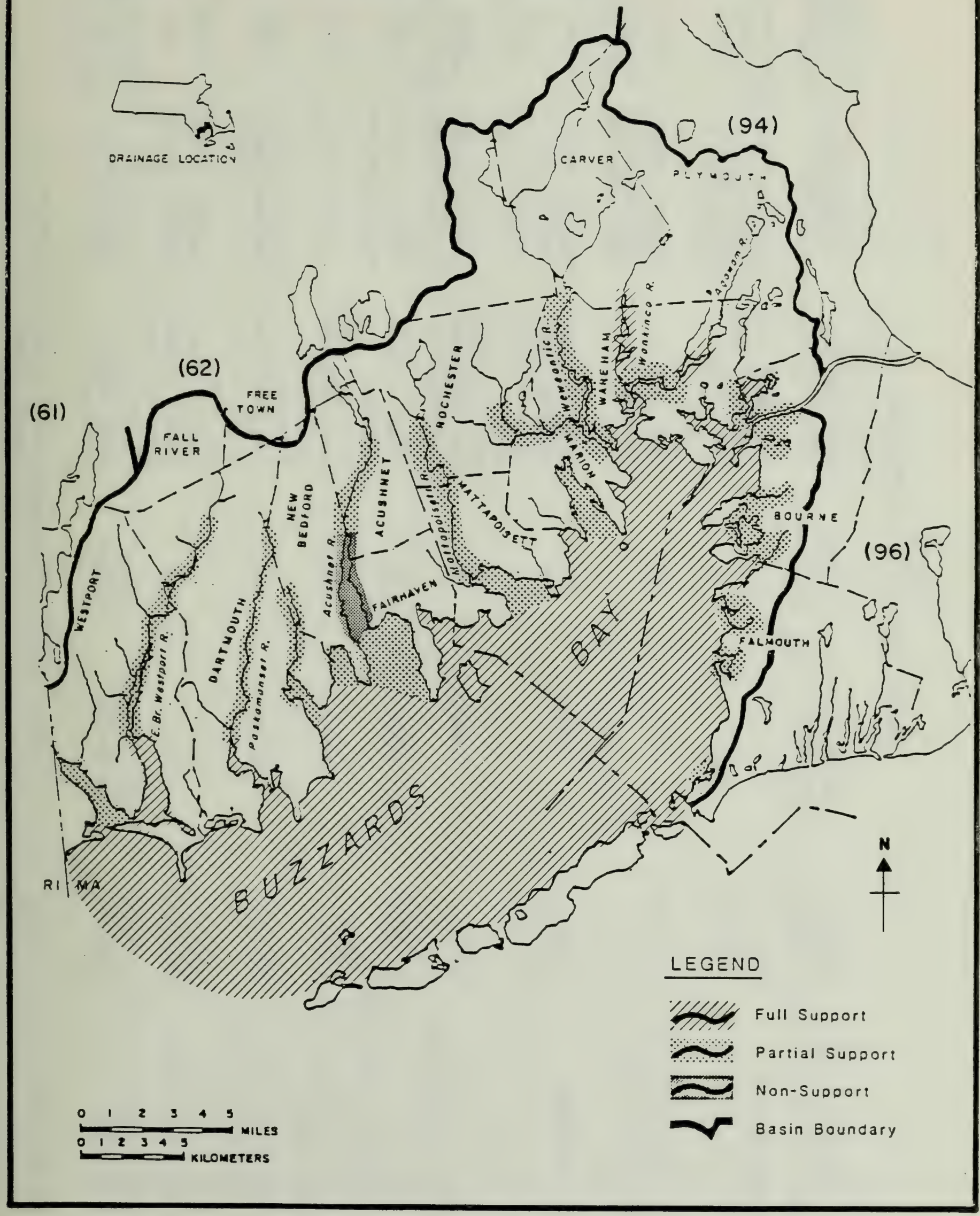


TABLE 4
BUZZARDS BAY COASTAL DRAINAGE AREA

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Buttermilk Bay	0.56 mi^2 0.18 mi^2	SA	S PS	Fecal coliform bacteria, Shellfish bans Nutrients	-Surface runoff -Boats -Septic tanks -Water fowl	-Best management practices (BMP)
Onset Bay	0.78 mi^2	SA	S	Fecal coliform bacteria	-Surface runoff -Boats -Septic systems	-BMP
Wareham River	2.6-0.6 0.6-0.0	SA/AD	S PS	Fecal coliform bacteria, Low D.O., Shellfish bans	-Surface runoff -Boats	-BMP
Weweantic River, above Horseshoe Pond	7.4-4.4	B/WWF/AD	PS	Fecal coliform bacteria, D.O.	-Surface runoff -Septic systems	-BMP
Weweantic River from Horseshore Pond to mouth	4.4-0.0	SA/AD	PS	Fecal coliform bacteria	-Surface runoff -Septic systems	-BMP
Sippican River above County Road	6.8-2.1	B/WWF/AD	PS	Fecal coliform bacteria	--	--
Sippican River, County Road to mouth	2.1-0.0	SA/AD	PS	Fecal coliform bacteria, D.O.	-Surface runoff -Septic systems	-BMP
Sippican Harbor	2.00 mi^2 0.76 mi^2	SA	S PS	Fecal coliform bacteria, D.O. Shellfish bans	-Surface runoff -Boats	-BMP
Aucoot Cove	0.47 mi^2	SA	S	Fecal coliform bacteria	-Point sources	--
Hiller Cove	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Unknown	--

TABLE 4 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Mattapoisett Harbor	1.02 mi^2	SA	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff -Boats	-BMP
Mattapoisett River	9.5-0.0	B/SCWF/AD	PS	Fecal coliform bacteria	-Surface runoff -Septic systems	-BMP
Westport River, West Branch	1.7 mi^2 0.22 mi^2	SA/AD	S PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	--
Clark Cove	1.15 mi^2	SA	PS	Fecal coliform bacteria, PCB's Metals, Nutrients Shellfish bans	-CSO. -Surface runoff -Sediments	-CSO control. -PCB sediment control.
Apponagansett Bay	0.46 mi^2 0.45 mi^2	SA	S PS	Fecal coliform bacteria, D.O. Shellfish bans	-Surface runoff -Waterfowl -Boats	-BMP
Westport River, East Branch from Outlet of Lake Noquochoke to old County Road	2.0-0.0	B/SCWF/AD	PS	Fecal coliform bacteria	-Surface runoff -Lincoln Amusement Park WWTP	-Improved WWTP operation.
Westport River from Old County Rd. to mouth	1.55 mi^2 1.55 mi^2	SB/AD	S PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff -Septic systems -Westport landfill	-BMP
New Bedford Inner Harbor from Coggeshall Bridge to Hurricane Barrier	1.17 mi^2	SB	NS	Dissolved Oxygen Fecal coliform bacteria, Metals PCB's, Nutrients Shellfish bans	-CSOs -Fairhaven WWTP -Industrial discharge -Surface runoff -Septic systems -Boats	-CSO control. -Control PCB in sediment.

TABLE 4 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Outer New Bedford Harbor	4.1 mi^2	SA	PS	Fecal coliform bacteria, Metals PCB, Shellfish bans	-New Bedford WWTP -Sediment	-Upgrade WWTP.
Agawam River above Wareham WWTP	4.0-2.0	B/SCWF/AD	S	Fecal coliform bacteria	-Surface runoff -Septic systems	-BMP
Agawam River below Wareham WWTP	2.0-0.0	B/SCWF	PS	Fecal coliform bacteria, Algae Shellfish bans	-Surface run -Waterfowl -Wareham WWTP	-BMP
Wankinco River	4.5-1.0 1.0-0.0	B/WWF/AD	S PS	Fecal coliform bacteria Nutrients	-Surface runoff -Septic systems -Carver landfill -Cranberry bogs	-BMP
Acushnet River to Hamlin Road	3.7-1.0	B/SCWF/AD	PS	Fecal coliform bacteria	-Surface runoff -Septic systems	-BMP
Acushnet River from Hamlin Rd. to Main St.	1.0-0.0	B/SCWF/AD	PS	Fecal coliform bacteria, D.O. Nutrients	-Surface runoff -Septic systems	-BMP
Acushnet River Estuary from Main St., to Coggeshall St. bridge	0.32 mi^2	SB/AD	NS	Dissolved Oxygen Fecal coliform bacteria, Metals PCB, Nutrients Shellfish bans	-Industrial discharges -CSOs -Sediments	-CSO control. -Control PCB in sediment.
Slocums River	2.6 mi^2	SA/AD	S	--	--	--

TABLE 4 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Paskamanset River	9.6-0.0	B/SCWF/AD	PS	Fecal coliform bacteria, D.O. Priority pollutants	-Dartmouth landfill -Surface runoff -Septic systems	-BMP
Shingle Island River	2.0-0.0	B/CWF/AD	PS	Fecal coliform bacteria, Toxics	-Surface runoff -Resolve superfund site	-Control superfund site
Buttonwood Brook	3.8-0.0	B/WWF/AD	PS	Fecal coliform bacteria, D.O. Ammonia	-Surface runoff	-BMP
Cape Cod Canal	5.9-0.0 6.0-5.9	SB	S PS	Fecal coliform bacteria, Oil spillage, Shellfish bans	-MA Maritime WWTP -Canal Electric -Boats -Surface runoff	-BMP
*Phinneys Harbor including Back River	1.34 mi^2 0.12 mi^2	SA/AD	S PS	Fecal coliform bacteria, D.O. Shellfish bans	-Surface runoff -Septic systems	--
*Pocasset River	1.00-0.04 0.04-0.00	SA/AD	S PS	Fecal coliform bacteria, D.O. Shellfish bans	-Surface runoff -Septic systems	--
*Pocasset Harbor	1.0 mi^2	SA/AD	PS	Fecal coliform bacteria, D.O.	-Surface runoff -Septic systems -Boats	-BMP
*Red Brook Harbor	2.18 mi^2	SA/AD	PS	Fecal coliform bacteria Shellfish bans	-Surface runoff -Boats	-BMP

TABLE 4 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
*Megansett Harbor	1.00 mi^2 0.39 mi^2	SA/AD	S PS	Fecal coliform bacteria	-Surface runoff -Boats	-BMP
*Wild Harbor	0.2 mi^2	SA/AD	PS	Fecal coliform bacteria	-Septic Systems -Boats	-BMP
*Herring Brook from source to mouth	1.0-0.0	SA/AD	PS	Fecal coliform bacteria, D.O.	-Septic Systems	-BMP
*West Falmouth Harbor	0.28 mi^2	SA/AD	PS	Fecal coliform bacteria, D.O.	-Surface runoff -Septic systems -Boats	-BMP
*Great Sippewisset Creek	1.0 mi^2	SA/AD	S	D.O.	-Surface runoff -Septic systems	--
*Little Sippewisset Creek	0.5 mi^2	SA/AD	S	D.O.	-Surface runoff	--
*Quissett Harbor	0.15 mi^2	SA/AD	PS	Fecal coliform bacteria, Shell-fish bans	-Surface runoff -Sediments -Boats	-BMP
**Cuttyhunk Pond, Gosnold	--	SA/AD	PS	Fecal coliform bacteria	-Septic systems -Boats	-BMP

Miles Assessed: 63.4 mi
Miles Supporting Classification: 14.4 mi
Miles Partially Supporting Classification: 48.0 mi

Square Miles Assessed: 29.75 mi^2
Square Miles Supporting Classification: 17.79 mi^2
Square Miles Partially Supporting Classification: 8.02 mi^2

* Cape Cod Drainage Basin (96)
** Islands Drainage Basin (97)

CAPE COD COASTAL DRAINAGE AREA (96)

Description of the Watershed

Cape Cod consists of 15 towns with a permanent 1985 population of 168,000. Its total area is 410 square miles of which 17 are covered by lakes and ponds. The Cape is devoid of any long rivers and streams. The Herring River, six miles in length, is the longest river on Cape Cod.

Although there are only a few small freshwater streams, ponds and lakes are abundant on Cape Cod. Most ponds are relics from the last period of glaciation which ended approximately 15,000 years ago. The ponds are often the result of the depressions intersecting the groundwater table. The groundwater is naturally low in nutrients and is slightly acidic. The Massachusetts Division of Fisheries and Wildlife has, on occasion, added lime to some ponds to neutralize them and to increase the productivity of fisheries.

Cape Cod with approximately 300 miles of shoreline is renowned for its beaches, swimming and other water based activities. Shellfishing, both recreational and commercial, is a large scale endeavor. Although the hard shell clams (Mercenaria mercenaria) are the main shellfish harvested chiefly from the Buzzards Bay area, some attempts to grow oysters on the south side of the Cape have also been made. Softshell clams and bay scallops are also important commercial species.

The groundwater system, which expresses itself at the surface in ponds, is the most important freshwater resource on the Cape. Groundwater is the water supply source for all drinking water on Cape Cod and is also the eventual receiving water for discharges from the few municipal and other treatment plants which now exist along with all of the individual home disposal systems.

Cape Cod was designated as a sole-source aquifer in 1982. This designation means that any federally funded project is subjected to careful review before it is approved in order to protect groundwater quality. In addition, the Cape Cod Aquifer Management Project (CCAMP), a two-year collaborative effort among DEQE, EPA, USGS and the Cape Cod Planning and Economic Commission, has recently completed its final report and has made many recommendations.

Water Quality Conditions and Trends

The Cape's increasing water quality problems can be characterized by increasing demands on a limited resource. The Cape's location places it within a one day's drive of roughly one-third of the nation's population. Further, its permanent population of approximately 150,000 people swells to three times that figure during the summer months with the influx of second home owners and vacationers.

The Cape's 300 miles of coastline, streams, embayments, salt ponds and estuaries support a wide range of uses, the most sensitive being shellfish harvesting and swimming. They also function as wildlife habitats, accommodate marinas, and serve as a receptacle for stormwater runoff. These coastal waters appear to be showing signs of stress as exemplified by the increasing number of closures

of shellfish harvesting areas, reported algal blooms and occasional fish kills. The principal sources of these problems appear to be stormwater runoff as it is associated with land development practices, marinas with poor waste disposal practices, failing septic systems, agricultural runoff and large populations of waterfowl. Because the Cape contains many individual streams, embayments and estuaries, it is necessary to evaluate each system on an individual basis, a costly and time consuming process.

The Division needs to update its limited data base in order to make better assessments as to the nature and extent of the perceived problems. The major problems associated with the Cape's fresh surface waters also appear to be related to eutrophication due to inputs of nutrients such as nitrogen and phosphorus loadings from faulty septic systems, and fertilizer runoff from golf courses, lawns and agricultural practices. In addition, the already acidic conditions exhibited in many of the lakes and ponds could be further exacerbated by acid rain.

Groundwater is the major source of drinking water on the Cape and as such must be fully protected. In various locations on Cape Cod, groundwater quality is threatened by the natural occurrence of iron and manganese or by saltwater intrusion. The latter has occurred in the North Truro-Provincetown area dating back to the 1930's. Future treatment may be necessary to remove iron and manganese from groundwater should their concentrations be high enough to hinder water use. Finally, elevated nitrates in groundwater resulting from overloaded or densely situated on-lot subsurface disposal systems, increased fertilizer use, and wastewater treatment plant discharges to the ground threatens groundwater use as a drinking water supply in some areas. One public well in Falmouth has already been closed due to contamination by leachate from a landfill at Otis Air Force Base.

Waste disposal practices on the Cape have primarily consisted of individual subsurface disposal systems. However, due to the impact of a larger population and the resulting new housing construction, developers are being required to build small package plants to treat wastewater prior to discharge to the ground. Presently, a total of 32 treatment plants discharge to the aquifer and the Division is reviewing 41 additional applications. Larger treatment facilities are located in Hyannis, Chatham, Falmouth and at the Otis and North Truro Air Force Bases. Facilities planning has begun in the towns of Bourne, Sandwich, Mashpee, Provincetown, Wellfleet, and Yarmouth.

Currently one-third of the land mass on the Cape remains available for development. Furthermore, the Cape Cod Planning and Economic Development Commission predicts by the year 2000, the year round population will be 230,000. During this period of growth, careful planning and coordinated aquifer management will be critical to preserving Cape Cod's water quality.

REFERENCES

Cape Cod Planning and Economic Development Commission. 1978. Water Quality Management Plan/EIS for Cape Cod. Barnstable, Massachusetts. 2 Volumes.

Cape Cod Planning and Economic Development Commission. 1982. Population Estimates and Projections for Barnstable County. June 1982. 10 pp.

MacConnel W., Swartout O., Stone J. 1984. Land Use Update for Cape Cod and the Islands with Area Statistics for 1951, 1971 and 1980. Research Bulletin Number 686. MA. Agricultural Exp. Stat. College of Food and Natural Resources. UMass, Amherst. 77 pp.

Massachusetts Division of Water Pollution Control. 1976. Cape Cod. Water Quality Management Plan. Westborough, Massachusetts. 61 pp.

_____. 1977. Cape Cod 1976 Water Quality & Wastewater Discharge Data. Westborough, Massachusetts. 133 pp.

_____. 1985. Cape Cod - Part B Wastewater Discharge Data 1982-1983 Westborough, Massachusetts. 37 pp.

_____. 1983. Herring River Survey. Westborough, Massachusetts. 35 pp.

_____. 1987. Cape Cod and Islands 1986-1987 Part A Coastal Water Quality Survey Data. Westborough, Massachusetts. In preparation.

_____. 1988. Cape Cod - Part B: Wastewater Discharge Data 1987. Westborough, Massachusetts. In preparation.

Figure 7 CAPE COD BASIN (96)

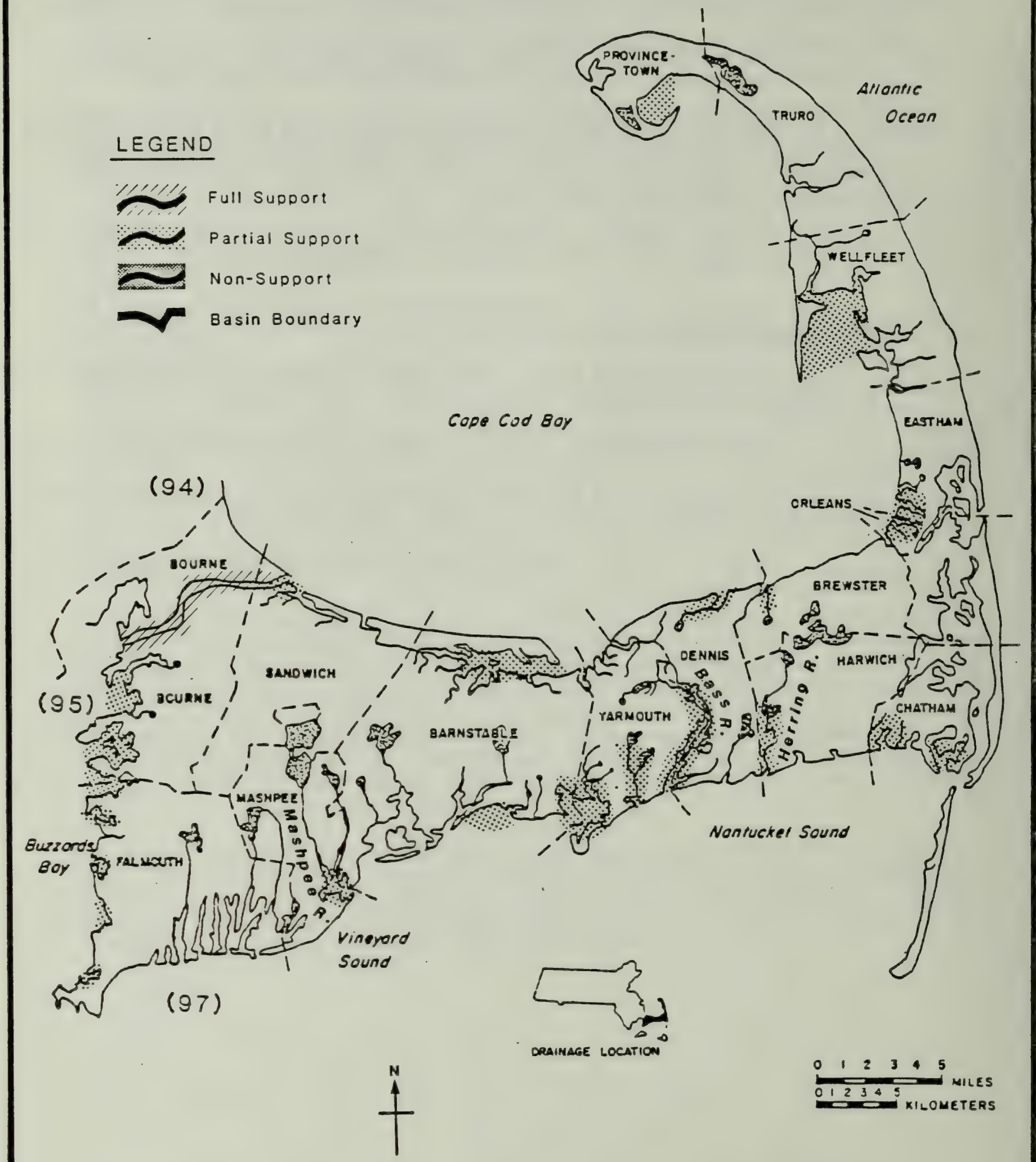


TABLE 5
CAPE COD COASTAL DRAINAGE AREA

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Barnstable Harbor, Barnstable	2.56 mi^2	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Bumps River, Barnstable	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	-BMP
Centerville Harbor, Barnstable	1.44 mi^2	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Centerville River, Barnstable	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff -Marinas	-BMP
Hyannis Harbor, Barnstable	0.47 mi^2	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff -Marinas	-BMP
Maraspin Creek, Barnstable	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	-BMP
Prince Cove, Barnstable	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	-BMP
Shoestring Bay, Barnstable	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	-BMP
Back River, Bourne	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff -Septic systems	-BMP

TABLE 5 (CONTINUED)

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Pocasset River, Bourne	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	-BMP
Red Brook Harbor, Brewster	2.18 mi^2	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff -Marinas	-BMP
Quivett Creek, Brewster	--	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Stoney Brook, Brewster	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	-BMP
Chatham Harbor, Chatham	6.06 mi^2	SA/AD	PS	Fecal coliform bacteria	-Surface runoff -Marinas	-BMP
Frostfish Creek, Chatham	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	-BMP
Red River, Chatham	--	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Stage Harbor, Chatham	0.86 mi^2	SA/AD	PS	Fecal coliform bacteria	-Surface runoff -Marinas	-BMP
Bass River, Dennis	--	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP

TABLE 5 (CONTINUED)

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Sesuit Creek, Dennis	--	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Swan Pond River, Dennis	--	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Boat Meadow River, Eastham	--	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Rock Harbor Creek, Eastham	--	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Falmouth Inner Harbor, Falmouth	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff -Marinas	-BMP
Great Harbor, Falmouth	0.35 mi^2	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff -Marinas	-BMP
*Herring Brook, Falmouth	--	SA/AD	PS	Fecal coliform bacteria	-Surface runoff -Marinas	-BMP
Little Harbor, Falmouth	0.05 mi^2	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff -Marinas	-BMP
*Megansett Harbor, Falmouth	1.39 mi^2	SA/AD	PS	Fecal coliform bacteria	-Surface runoff -Marinas	-BMP

TABLE 5 (CONTINUED)

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Moonakiss River, Falmouth	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	-BMP
*Pocasset Harbor, Falmouth	--	SA/AD	PS	Fecal coliform bacteria, D.O.	-Surface runoff -Septic system -Boats	-BMP
*Quisset Harbor, Falmouth	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff -Marinas	-BMP
*Little Sippewisset Creek, Falmouth	--	SA/AD	S	D.O.	-Surface runoff	-BMP
*Great Sippewisset Creek, Falmouth	--	SA/AD	S	D.O.	-Surface runoff	-BMP
*Phinneys Harbor	--	SA/AD	PS	Fecal coliform bacteria, D.O. Shellfish bans	-Surface runoff -Septic systems	-BMP
*Pocasset River	--	SA/AD	PS	Fecal coliform bacteria, D.O. Shellfish bans	-Surface runoff -Septic systems	-BMP
*Red Brook Harbor	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff -Boats	-BMP
Waquoit Bay, Falmouth	1.54 mi^2	SA/AD	PS	Fecal coliform bacteria	-Surface runoff -Marinas	-BMP

TABLE 5 (CONTINUED)

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
*Wild Harbor	--	SA/AD	PS	Fecal coliform bacteria	-Septic systems -Boats	-BMP
*Wild Harbor River, Falmouth	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	-BMP
*West Falmouth Harbor	--	SA/AD	PS	Fecal coliform bacteria, D.O.	-Surface runoff -Septic systems -Boats	-BMP
Herring River, Harwich	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff -Waterfowl	-BMP
Red River, Harwich	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	-BMP
Saquatucket Harbor, Harwich	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	-BMP
Mashpee River, Mashpee	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	-BMP
Red Brook, Mashpee	--	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Shoestring Bay, Mashpee	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	-BMP

TABLE 5 (CONTINUED)

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Little Namskaket Creek, Orleans	--	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Namskaket Creek, Orleans	--	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Nauset Harbor, Orleans	2.00 mi^2	SA/AD	PS	Fecal coliform bacteria	-Surface runoff -Marinas	-BMP
Provincetown Harbor, Provincetown	3.82 mi^2	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Septic systems -Marinas	-BMP
Old Harbor Mill Creek, Sandwich	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff -Boats	-BMP
Scortan Creek, Sandwich	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff -Septic systems	-BMP
Pamet River, Truro	--	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Duck Creek, Wellfleet	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	-BMP
Herring River, Wellfleet	--	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-Surface runoff	-BMP

TABLE 5 (CONTINUED)

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Wellfleet Harbor, Wellfleet	7.27 mi^2	SA/AD	PS	Fecal coliform bacteria	-Surface runoff -Marinas	-BMP
Chase Garden Creek, Yarmouth	--	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Lewis Bay, Yarmouth	1.35 mi^2	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Mill Creek, Yarmouth	--	SA/AD	PS	Fecal coliform bacteria, Shell-fish bans	-Surface runoff	-BMP
Parker River, Yarmouth	--	SA/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP

Square Miles Assessed: 25.59 mi^2
Square Miles Supporting Classification: 0.0 mi^2
Square Miles Partially Supporting Classification: 25.59 mi^2

* Also listed under Buzzards Bay Drainage Basin (95)

CHARLES RIVER BASIN AND COASTAL DRAINAGE AREA (72)

Description of the Watershed

The Charles River, the longest river in Massachusetts with a length of 80 miles, begins as a spring on the southerly slope of Honey Hill in the town of Hopkinton. From this humble beginning the river meanders its way through numerous communities in eastern Massachusetts and culminates by discharging into Boston Harbor at the outlet of the Charles River Basin. The river basin encompasses an area of 307 square miles and is somewhat hour-glassed in shape. The watershed is between five and 15 miles wide and approximately 31 miles in length. With a beginning elevation of 500 feet above mean sea level, the river ends at sea level in Boston Harbor.

An outstanding feature of the Charles River is its meandering nature through extensive wetlands which border the river through much of its course. These wetlands account for about 20,000 acres, approximately one-tenth of the watershed area. This buffer zone acts as a significant area of wildlife propagation and as a natural hydraulic storage area which can help dampen peak flood flows.

The stream flow of the river is monitored by three USGS stream gages; one located in Dover with a drainage area of 184 square miles, one located in Wellesley with a drainage area of 211 square miles and the other located in Waltham with a drainage area of 227 square miles. The average yearly flow at the gages are 306, 284 and 305 cubic feet per second (cfs), respectively. In the town of Dedham, a small portion of the Charles River flow is diverted through the Mother Brook diversion to the Neponset River. The diversion was originally constructed for hydro-power but its current status has been relegated to flood control purposes. It has been proposed by the Division that the diversion be eliminated except in times when flood control is necessary. This program would allow the Charles River to maintain a higher streamflow which would increase its waste assimilative capacity.

The upper portion of the Charles River receives discharges from the Milford, Upper Charles, and Medfield wastewater treatment facilities. Pondville State Hospital WWTP, Norfolk-Walpole MCI WWTP and the Wrentham State School WWTP discharge to the Stop River.

The middle and lower portions of the Charles River Basin are serviced by the Massachusetts Water Resources Authority (MWRA) system which conveys its wastewater to the Deer Island and Nut Island WWTP's in Boston Harbor. Thus, there are no significant discharges to the Charles River in this portion of the river. The main detrimental impacts are from stormwater and urban runoff associated with streams in heavily developed areas.

Water Quality Conditions and Trends

Significant water pollution abatement actions (as referenced above) and numerous industrial dischargers which have gone out of business have improved the water quality of the Charles River. However, major problems remain in the basin including: impacts from the Milford WWTP, especially in the area of Box Pond;

low dissolved oxygen levels in the Stop River, which are caused by a combination of the discharge from the Norfolk-Walpole MCI WWTP and the natural oxygen demand exerted by the wetlands on the stream; moderate eutrophication caused by sluggish flows and impounded waters that still receive high levels of nutrients; and stormwater that carries silt, oil and grease, and bacteria. In addition, numerous combined sewer overflows in the lower half of the river cause high coliform bacteria during wet weather.

The three major WWTP's on the Charles (Milford, Upper Charles and Medfield) are all advanced plants. Recently the Millis WWTP tied into the Upper Charles WWTP and the Medfield State Hospital tied into the Medfield WWTP, eliminating two discharges from the Charles. The town of Bellingham is currently being sewered with treatment at the Upper Charles WWTP and the town of Wrentham is studying the option of sewering.

The combined sewer overflows along the Wellesley and Framingham extension sewer lines have been studied with corrective actions recommended. The projects are currently out for bid and construction of increased capacity should be completed within a few years.

The Charles Basin, located in the last 9.8 miles of the Charles River from the Watertown Dam to the discharge into Boston Harbor at the Charles River Dam, is classified as class C. This is the only freshwater class C segment in the state. Fishing and primary contact recreation are limited although boating, crew racing and secondary recreation are extensively done.

The water quality in the Charles Basin is severely impacted by combined sewer overflows and anaerobic conditions in the lower strata of the basin. The combined sewer overflows are part of a sewage system which is over 100 years old. A CSO study for Boston was conducted in 1980, along with a water quality survey of the basin and tributaries leading into the basin, particularly from the Back Bay Fens and the Muddy River. Fecal coliform levels as high as 85,000 per 100 ml were measured in August 1984. Several construction grant projects have been recommended to reduce the coliform bacteria problem and reduce the combined sewer overflows. The required projects are on the Division's extended priority list, but none have received funding to date. With reduced federal construction grant monies it is likely that other funding mechanisms will be necessary for these projects.

The other problem, anaerobic conditions, was caused by rich organic bottom sediments with a dense saline water cover which prevented mixing. Saltwater from the use of the Science Park dam and locks was trapped in the basin, causing anaerobic and septic conditions in the bottom. Steps to remedy this problem have occurred with the reconstruction of the Charles River Dam to reduce the saltwater intrusion and aeration via mechanical aerators to destratify the saline layer. The quality of the Charles Basin is improving but will never get above the Class C criteria until the combined sewer overflow problems are corrected.

The Lower Charles River and Charles River Basin receives much of its degradation from urban and storm runoff. These are often combined with sewers and overflow as combined sewer overflows.

Another major factor is failing septic systems in many of the towns, near the headwaters of the Charles. Various towns have hired consulting engineers to study the problem and a few towns are beginning to sewer problem areas.

Much of the Charles River travels through extensive wetlands and marshes. Although these are beneficial in their flood protection, they also contribute tannins, organic matter and dissolved oxygen violations. These are natural conditions that cannot be improved.

REFERENCES

Massachusetts Division of Water Pollution Control. 1974. The Charles River 1973 Part A - Water Quality Data. Westborough, Massachusetts. 112 pp.

_____. 1976. The Charles River 1976 Part D - Water Quality Management Plan. Westborough, Massachusetts. 143 pp.

_____. 1978. The Charles River Water Quality Data - 1978. Westborough Massachusetts. 74 pp.

_____. 1981. The Upper Charles River Basin Water Quality Data 1980. Westborough, Massachusetts. 29 pp.

_____. 1981. The Upper Charles River Basin Water Quality Data 1981. Westborough, Massachusetts. 50 pp.

_____. 1984. The Lower Charles River Basin Water Quality Data 1984. Westborough, Massachusetts. 45 pp.

_____. 1981. Charles River Basin Wastewater Discharge Survey Data 1980 and 1981. Westborough, Massachusetts. 35 pp.

_____. 1987. Upper Charles River Survey 1986 - Water Quality Data, Wastewater Discharge Data, Water Quality Analysis. Westborough, Massachusetts. 97 pp.

_____. 1988. Charles River Management Plan. Westborough, Massachusetts. 74 pp.

_____. 1988. Charles River Survey 1987 - Water Quality Data, Wastewater Discharge Data. Westborough, Massachusetts. (in preparation).

Figure 8 CHARLES RIVER BASIN (72)

BASIN AND DRAINAGE LOCATION

LEXINGTON
LINCOLN
SOMERVILLE
EVERETT
ARLINGTON
BELMONT
WALTHAM
Beaver Bk
WATERTOWN
CAMBRIDGE
WAYLAND
WESTON
Stony Bk
Charles R
Watertown Dam
NEWTON
Charles River Dam
Meadow Bk
BROOKLINE
WELLESLEY
Sawmill Bk
BOSTON
NATICK
Waban Bk
NEEDHAM
Charles R
DEDHAM
Mother Bk
ASHLAND
SHERBORN
DOVER
HOPKINTON
WESTWOOD
Chicken Bk
MEDFIELD
Echo Lake
HOLLISTON
Hopping Bk
Bogastow Bk
Sugar Bk
Cedar Swamp Pd.
MILLIS
MIL-FORD
MEDWAY
Charles R
Stop R
WALPOLE
NORFOLK
HOPEDALE
Charles R
Mine Bk
FRANKLIN
Mill R
MENDON
FOXBOROUGH
BELLINGHAM
WRENTHAM

N

0 1 2 3 4 5 MILES
0 1 2 3 4 5 KILOMETERS

LEGEND

- Full Support
- Partial Support
- Non-Support
- Basin Boundary

TABLE 6
CHARLES RIVER BASIN AND COASTAL DRAINAGE AREA

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Charles River						
Headwaters in Hopkinton to Dilla Street, Milford	78.9-76.5	A	S	--	--	--
Dilla Street, Milford to Milford STP	76.5-73.4	B/AL	NS	Fecal coliform bacteria, Dissolved oxygen Solids	-CSOs -Urban runoff	-Increased sewer capacity to be installed.
Milford STP to Box Pond, Bellingham	73.4-70.3	B/WWF	NS	Fecal coliform bacteria, Nutrients Dissolved oxygen	-Milford STP	-Proper operation of upgraded plant.
Box Pond, Bellingham to Populatic Pond, Norfolk	70.3-58.9	B/WWF	S	--	--	--
Populatic Pond, Norfolk to South Natick Dam	58.9-41.0	B/SCWF	S	Diurnal dissolved oxygen	-Algae -Aquatic macrophytes	-Inherent condition.
South Natick Dam to Chestnut St., Needham	41.0-33.0	B/WWF	S	--	--	--
Chestnut St., Needham to Watertown Dam, Watertown	33.0-9.8	B/WWF	PS	Fecal coliform bacteria	-CSOs -Urban runoff	-Eliminate CSOs.
Charles Basin Watertown Dam to Charles River Dam, Boston	9.8-0.0	C/WWF	NS	Fecal coliform bacteria, Dissolved oxygen	-CSOs -Urban runoff -In-place sediments	-CSO elimination. -BMP

TABLE 6 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Stop River Headwaters in Wrentham to Norfolk-Walpole MCI WWTP, Cedar Jct.	8.8-4.1	B/SCWF/AD	S	--	--	--
Stop River from Norfolk-Walpole MCI WWTP to confluence with the Charles River, Medfield	4.1-0.0	B/SCWF/AD	PS	Dissolved oxygen	-Norfolk-Walpole MCI WWTP -Natural wetlands	-Evaluation and control of WWTP. -Due to natural conditions of wetlands, low D.O. levels will continue.
Back Bay Fens from the Muddy River to the confluence with the Charles Basin, Boston	1.5-0.0	C/WWF	NS	Fecal coliform bacteria Dissolved osygen	-Combined sewer overflows -Inplace sediments -Urban runoff	-Combined sewer separation. -Dredging of sediments.
Muddy River from Jamaica Pond to the Back Bay Fens, Boston	2.7-0.0	C/WWF	NS	Fecal coliform bacteria Dissolved oxygen	-Combined sewer overflows -Urban runoff	-Combined sewer separation.

Miles Assessed: 91.9 mi
Miles Supporting Classification: 44.4 mi
Miles Partially Supporting Classification: 27.3 mi

CHICOPEE RIVER BASIN (36)

Description of the Watershed

The Chicopee River Basin covers an area of over 720 square miles in central Massachusetts. All or part of 32 towns lie within the basin, with the majority of the population concentrated in the Springfield Metropolitan Area. Generally, the remaining area typifies the image of rural New England countryside with rolling hills, woodlands, small ponds, and winding brooks.

The basin includes four major adjoining river systems--the Ware River, Swift River, Quaboag River, and the Chicopee River--which together contribute an average flow of about 925 cubic feet per second (598 million gallons per day) to the Connecticut River.

The Ware River is formed by the confluence of the east and west branches in Barre. The west branch drains a swamp in Hubbardston while the east branch, which carries the greater flow, originates in Rutland. From their confluence the Ware River flows generally southwest for a distance of 34 miles, dropping in elevation some 380 feet and draining an area of 219 square miles. Classified A in its upper reaches, Ware River water is diverted seasonally by the Metropolitan District Commission to Quabbin Reservoir. Below the reservoir intake to just below Barre center the river is classified B. It receives untreated sewage from Barre, treated sewage from Hardwick and Ware, and industrial discharges from Barre, Ware and Palmer. Also, three major impoundments impede its progress in Hardwick, Ware, and Palmer. The Ware River joins the Quaboag River at Three Rivers in Palmer.

The three upper branches of the Swift River flow into Quabbin Reservoir, a major component of the water supply for metropolitan Boston. Quabbin Reservoir was formed by the construction of Windsor Dam which now controls the upper 186 square miles of drainage area of the Swift River. Below Quabbin, the largest inland body of water in Massachusetts, the Swift River continues in a southerly direction for 10 miles until its confluence with the Ware River, less than a mile above Three Rivers, and drains an additional 30 square miles. Above Windsor Dam, the Swift River is classified A, and below the dam it is classified B.

The Quaboag River flows in a southwesterly direction for over 37 miles until it joins the Ware River at Three Rivers. Along this course the elevation drops some 650 feet. From its source in Spencer the river is known first as the Seven Mile River, which joins the East Brookfield River, which in turn enters Quaboag Pond. Emerging from Quaboag Pond in a flat swampy area, the Quaboag gathers flow and velocity encountering only one small impoundment in west Warren before it joins the Ware River. The Quaboag River drains 210 square miles and is classified B, except for a few reservoirs on its tributaries which are classified A. The Quaboag receives domestic discharges from Spencer and the Brookfields, as well as Warren and Palmer. Small industrial discharges are located in Brookfield, Warren and Palmer.

The confluence of the Ware and Quaboag Rivers forms the Chicopee River, which continues 18 miles through the more heavily populated and industrialized portion

of the basin and over a series of dams, some of which can regulate the flow. The Chicopee River is classified B and receives both domestic and industrial discharges along its course, until it joins the Connecticut River in Chicopee.

Water Quality Conditions and Trends

The Ware River in general meets existing class B water quality standards. Barre Center and South Barre contribute high coliform densities from domestic waste discharges and the septic system at Ivy Enterprises (formerly Barre Wool Combing). All domestic waste discharges will be eliminated during the next three years with the construction of a collection and treatment system. Construction on the collection system began in September 1987. In the interim, the septic tank at Ivy Enterprises will be repaired and disinfection will be required.

The Ware River below the town of Ware had been polluted by industrial and domestic wastewater until the spring of 1985. The Ware WWTP was upgraded to advanced waste treatment and ammonia and phosphorus removal began in April 1985. Pretreated industrial wastewater is now tied to the new treatment system. Occasionally phosphorus and bacteria concentrations increase in the Ware River, possibly from agricultural runoff near Gibbs Crossing.

The upper reaches of the Quaboag River, including the Seven Mile and East Brookfield Rivers, are sensitive to domestic wastewater and agricultural runoff. Although existing discharges to the stream are highly treated, dissolved oxygen class B violations are common. The Seven Mile River's water quality problems will be alleviated with the design and construction of an advanced waste treatment system containing nutrient removal in an artificial wetland system. Construction began in May 1987. Dunn Brook, a tributary to the Quaboag River in Brookfield, has high concentrations of total phosphorus below the discharge of the North Brookfield WWTP. A facility plan for advanced waste treatment is currently underway. Phase I is scheduled to be completed in 1988. The Quaboag River from West Brookfield to Monson has high coliform densities due to overland runoff and the Warren WWTP. Construction of a new secondary treatment facility at Warren will be completed within a few years. The Palmer-Monson sewage collection system has had several domestic discharges, combined sewers and industries tie into its system, further reducing high coliform levels in the Quaboag River.

The Chicopee River water quality has improved due to the completion of the Palmer WWTP in 1980, the elimination of individual discharges in Palmer and Monson, and the tie-in of high strength industrial wastes to the Springfield Regional Wastewater Treatment Facility at Bondi Island. The Wilbraham Wastewater Treatment Plant has been converted to a pumping station to transport waste to Bondi Island. Class B standards are thus generally met in this segment except during storm events when combined sewers discharge domestic wastewater to the river.

REFERENCES

Massachusetts Division of Water Pollution Control. 1979. Upper Quaboag River Basin Water Quality Data, 1979. Westborough, Massachusetts.

_____. 1980. Chicopee River Basin Wastewater Discharge Data, 1979. Westborough, Massachusetts. 25 pp.

_____. 1980. Red Bridge Impoundment 1977-1978 Water Quality Study. Westborough, Massachusetts. 102 pp.

_____. 1981. Chicopee River Basin Water Quality and Wastewater Discharge Data, 1980. Westborough, Massachusetts. 121 pp. (with appendices).

_____. 1981. Chicopee River Basin 1981 Water Quality Management Plan. Westborough, Massachusetts. 61 pp. (with appendices).

_____. 1982. Chicopee River Basin 1981 Water Quality Survey Data. Westborough, Massachusetts. 55 pp.

_____. 1982. Upper Quaboag River Basin Water Quality Survey Data - 1982. Westborough, Massachusetts. 18 pp.

_____. 1983. Upper Quaboag River Basin Water Quality Survey Data - 1983. Westborough, Massachusetts. 21 pp.

_____. 1984. Chicopee River Basin Wastewater Discharge Survey Data 1981, 1982, and 1983. Westborough, Massachusetts. 46 pp.

_____. 1985. Ware and Chicopee River Water Quality and Wastewater Discharge Survey Data. Westborough, Massachusetts. 38 pp.

Figure 9 CHICOPEE RIVER BASIN (36)

TABLE 7
CHICOPEE RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Ware River Basin						
East Branch Ware River from Rutland to Barre Falls Dam, Barre	4.8-0.0	A	S	--	--	--
West Branch Ware River and Ware River above MDC intake, Barre	46.0-29.1	A	S	--	--	--
MDC intake to South Barre	29.1-27.3	B/CWF/AD	S	--	--	--
South Barre to Wheelwright Dam, Wheelwright	27.3-23.3	B/WWF	PS	Fecal coliform bacteria	-Domestic discharges	-Collection and treatment.
Wheelwright Dam to Ware Dam, Ware	23.3-12.2	B/WWF	PS	Fecal coliform bacteria	-Isolated discharges	--
Ware Dam to Gibbs Crossing, Ware	12.2-8.3	B/WWF	PS	Fecal coliform bacteria	-Surface runoff -Agricultural runoff	-Best management practices (BMP).
Gibbs Crossing to confluence with Quaboag River, Palmer	8.3-0.0	B/WWF	S	Phosphorus	-Surface and agricultural runoff.	-Best management practices (BMP).
Prince River	8.4-0.0	B/WWF/AD	S	--	--	--

TABLE 7 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Swift River above Windsor Dam, Belchertown	above 9.8	A	S	--	--	--
Windsor Dam to Bondsville	9.8-4.4	B/CWF	PS	Solids Nutrients	-McLaughlin Fish Hatchery	-Solids removal from fish hatchery effluent.
Bondsville to confluence with Ware River, Palmer	4.4-0.0	B/CWF	PS	Fecal coliform bacteria	-Domestic dischargers	-Isolated domestic dischargers eliminated.
Quaboag River Basin						
Sevenmile River from Source to Spencer WWTP	8.6-2.4	B/SCWF/AD	S	Dissolved oxygen	-Natural conditions	--
Spencer WWTP to confluence with East Brookfield River, East Brookfield	2.4-0.0	B/SCWF	PS	Dissolved oxygen Nutrients	-Spencer WWTP.	-Upgrade Spencer WWTP.
East Brookfield River to Quaboag Pond, East Brookfield	2.2-0.0	B/SCWF	S	Dissolved oxygen	-Natural conditions	--
Quaboag River from Brookfield to Route 67 bridge, West Brookfield	24.9-19.2	B/AL	S	Dissolved oxygen	-Natural conditions	--

TABLE 7 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Route 67 bridge to Warren WWTP	19.2-13.1	B/WWF	PS	Fecal coliform bacteria	-Agricultural runoff	-Best Management Practices (BMP).
Warren WWTP to Route 32 bridge, Palmer-Monson	13.1-5.1	B/WWF	PS	Fecal coliform bacteria	-Surface runoff -CSOs	-Control CSOs under construction grants.
Route 32 bridge to confluence with Ware River, Palmer	5.1-0.0	B/WWF	PS	Fecal coliform bacteria	-Stormwater runoff	--
Dunn Brook above North Brookfield WWTP, Brookfield	4.9-3.4	B/WWF/AD	S	--	--	--
North Brookfield WWTP to Slab City Road, North Brookfield	3.4-2.4	B/WWF	PS	Phosphorus Fecal coliform bacteria	-North Brookfield WWTP -Wetlands	-Upgrade North Brookfield WWTP to advanced treatment.
Slab City Road to confluence with Quaboag River, Brookfield	2.4-0.0	B/WWF	PS	Phosphorus, Fecal coliform bacteria	-Failing septic systems	-Facility planning in Brookfield.
Chicopee Brook, to confluence with Quaboag River, Monson	7.0-0.0	B/SCWF/AD	S	--	--	--

TABLE 7 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Chicopee River						
Source in Palmer to Red Bridge impoundment	17.9-15.2	B/WWF	PS	Fecal coliform bacteria Phosphorus	-Surface and agricultural runoff -Palmer-Monson WWTP	-Best management practices (BMP).
Red Bridge Dam to Wilbraham WWTP	15.2-11.7	B/WWF	PS	Fecal coliform bacteria	-Surface runoff	--
Wilbraham WWTP to Chicopee Falls, Chicopee	11.7-3.0	B/WWF	PS	Fecal coliform bacteria	-CSOs	-Elimination or treatment.
Chicopee Falls to confluence with Connecticut River, Chicopee.	3.0-0.0	B/WWF	NS	Dissolved oxygen Fecal coliform bacteria	-Combined sewer overflows -Urban runoff	-Combined sewer overflows. -Elimination or treatment.

Miles Assessed: 134.5 mi
Miles Supporting Classification: 62.8 mi
Miles Partially Supporting Classification: 68.7 mi

CONNECTICUT RIVER BASIN (34)

Description of the Watershed

The Connecticut River begins in Canada and for most of its course north of Massachusetts serves as the boundary between New Hampshire and Vermont. The river flows essentially due south through Massachusetts from Bernardston and Northfield, on the Vermont - New Hampshire state line, to Agawam and Longmeadow on the Connecticut state line. From this point the Connecticut River flows south through the state of Connecticut to Long Island Sound. The Connecticut River from its source to its mouth is 410 miles long.

The segment of the Connecticut River that travels through Massachusetts is 66 miles long. The drainage area of this river segment is 650 square miles, and the basin has a population of 500,000 people. The four major tributaries to the Connecticut River in Massachusetts are the Millers, Deerfield, Chicopee, and Westfield Rivers. Each of these rivers are dealt with separately in this report. The Connecticut River is the largest river in terms of flow in Massachusetts.

The Massachusetts portion of the Connecticut River basin can be divided into two portions by the dam in Holyoke. The watershed below the dam is predominantly urban. The majority of the basin's population is located in the lower watershed, in the greater Springfield area. Most of the industrial development is located in the lower watershed, as well. The watershed above the dam is less densely populated. Historically, the upper basin was rural. Large portions of the upper watershed were used for farming. Presently, much of this farmland is being developed for housing and other suburban uses.

Water Quality Conditions and Trends

Water quality surveys conducted by the Division in 1971 and 1973 showed moderate levels of pollution in the upper Connecticut River, and severely polluted water in the lower Connecticut River. At that time, wastewater discharges in the river basin received poor treatment, or were untreated. Since then, secondary wastewater treatment facilities have been built in Amherst, Chicopee, Easthampton, Hatfield, Holyoke, Northampton, South Hadley, and Springfield. Many of these plants also treat significant amounts of industrial wastewater. There are few direct industrial discharges in the basin.

The implementation of secondary wastewater treatment has greatly improved Connecticut River water quality. The most recent water quality surveys conducted in the basin were in 1983. Water quality in the river above the dam, in general, was very good. Dissolved oxygen concentrations were well above the Class B standard of 5.0 mg/l. Nutrient and solids levels were low, and metals concentrations were generally below detection limits. Occasional violations of the fecal coliform bacteria limit of 200 org/100 ml were observed. Elevated bacteria levels were seen in two portions of the upper Connecticut River. Bacteria concentrations were elevated in the uppermost segment of the river. The bacteria was probably from some source above the state line. Bacteria concentrations were also elevated in the segment of river near Montague and Turners

Falls. These violations were attributed to combined sewer discharges in Montague. A major sewer project rehabilitation has been completed since the 1983 survey. However, this river segment has not been sampled since the project was completed.

The 1983 Connecticut River water quality surveys also documented improved water quality in the lower portion of the river. Dissolved oxygen concentrations were above 5.0 mg/l, and nutrient and solids levels were low. However, bacteria concentrations were high throughout the lower Connecticut River during both wet and dry weather. The high bacteria levels were caused by discharges from combined sewers. The combined sewer overflows (CSOs) also discharge floatable solids which cause aesthetics problems in the river, but cannot be quantified. There are 130 CSOs which discharge to the Connecticut River and portions of the Westfield and Chicopee Rivers, just upstream of the Connecticut.

The Division has funded a major program to develop abatement strategies for the CSOs. The program was conducted in two phases. The second phase will be completed in the early spring of 1988. An abatement program will be developed for each of seven communities with CSOs. The Division will then begin to fund design and construction of these abatement projects.

REFERENCES

Massachusetts Division of Water Pollution Control. 1978. Connecticut River 1978 Wastewater Discharge Data. Westborough, Massachusetts. 58 pp.

_____. 1979. Connecticut River Basin 1978 Water Quality Survey Data. Westborough, Massachusetts. 147 pp.

_____. 1980. Connecticut River 1979 Wastewater Discharge Data. Westborough, Massachusetts. 42 pp.

_____. 1981. Connecticut River Basin 1980 Belchertown Water Quality Survey Data. Westborough, Massachusetts. 48 pp.

_____. 1982. Connecticut River Basin 1980 Water Quality Survey Data. Westborough, Massachusetts. 60 pp.

_____. 1983. Connecticut River Basin 1982 Water Quality Management Plan. Westborough, Massachusetts. 95 pp.

_____. 1984. Connecticut River 1982-1983 Water Quality and Wastewater Discharge Survey. Westborough, Massachusetts. 198 pp.

Figure 10

CONNECTICUT RIVER BASIN (34)

BASIN LOCATION

LEGEND

- Full Support
- Partial Support
- Non-Support
- Basin Boundary

TABLE 8
CONNECTICUT RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Connecticut River						
NH line to Route 10 bridge, Northfield	138.2-134.7	B/WWF	PS	Fecal coliform bacteria	-Discharges above MA state line	--
Rt. 10 bridge to Turners Falls Dam, Montague	134.7-123.8	B/WWF	S	--	--	--
Turners Falls Dam to confluence with Deerfield River, Greenfield	123.8-120.8	B/WWF	PS	Fecal coliform bacteria	-CSOs from Turners Fall section of Montague	-Control of CSOs
Deerfield River to Holyoke Dam, Holyoke	120.8-86.6	B/WWF	S	--	--	--
Holyoke Dam to CT line, Longmeadow/ Agawam	86.6-70.7	B/WWF	NS	Fecal coliform bacteria	-CSO and dry weather sewer overflows	-Control of CSOs/DWOs
Weston Brook, Lampson Brook, Belchertown-Granby	12.4-9.1	B/WWF	PS	Nutrients Dissolved oxygen	-Belchertown STP discharge	-Eliminate discharge
Outlet of Forge Pond in Granby to the Connecticut River in South Hadley	9.1-0.0	B/WWF	S	--	--	--

Miles Assessed: 79.9 mi
Miles Supporting Classification: 54.2 mi
Miles Partially Supporting Classification: 9.8 mi

DEERFIELD RIVER BASIN (33)

Description of the Watershed

The Deerfield River represents a classic example of a formerly "wild river" which has been tamed by man. For most of its course in Massachusetts the Deerfield once ran through deep valleys on a steep gradient. The gradient decreased and the velocity lessened in the last few miles as the Deerfield flowed across the flood plain of the Connecticut River, but even at this point the Deerfield still was shallow and flowed rapidly to its confluence with the Connecticut River. Now the flow of the Deerfield is continually interrupted by power dams located along its course in Massachusetts and Vermont.

The headwaters of the Deerfield are in Vermont. After flowing through a series of reservoirs constructed by the electric utility companies, the Deerfield first enters Massachusetts as the discharge from Sherman Reservoir. For most of its length in Massachusetts, the river is alternately impounded behind electric utility dams, or flows on a steep gradient through sparsely populated valleys until it reaches the next downstream impoundment. After flowing for 44 miles through Massachusetts, the Deerfield joins the Connecticut River at the Greenfield-Deerfield town line.

Major tributaries to the Deerfield in Massachusetts are the North River and the Green River. These join the Deerfield in Shelburne Falls and Greenfield, respectively. Several of the tributaries to the Deerfield are either presently in use as water supplies or are being considered for future use as water supplies.

The population of the Deerfield Basin in Massachusetts was 30,823 in 1980. The average flow in the Deerfield at its confluence with the Connecticut River is 1,285 cfs. This is the average discharge reported by the USGS for the last 43 years. Wastewater treatment plant flows to the Deerfield Basin are somewhat less than 10 percent of the low flow stream discharge. The seven day,ten year low flow (7Q10) is 95.6 cfs, as compared to the sum of all the treatment plant flows reported by MDWPC for 1981, which equal 7.6 cfs.

Water Quality Conditions and Trends

The major wastewater discharges to the Deerfield are the cooling water discharge from the Yankee Atomic Plant at Rowe, the discharge from the Deerfield Specialty Products Wastewater Treatment Plant at Monroe Bridge, the treated discharge from Kendall Fiber Products in Colrain, and the Old Deerfield, Greenfield, Buckland/Shelburne and Charlemont Wastewater Treatment Plants.

Water quality surveys conducted by the DWPC have shown very good water quality throughout most of the basin. With the exception of the Greenfield area, the watershed is sparsely populated. Pollutant loadings from point sources are relatively low. During the most recent survey, there were three areas of the watershed which had impaired water quality. The South River, near Ashfield, had high levels of bacteria and nutrients. These pollutants were from untreated domestic discharges in the town center. Ashfield is currently in facilities planning for a wastewater system to treat this wastewater.

High bacteria concentrations also were documented in the Deerfield River and it tributaries near Charlemont. This pollution was also caused by untreated domestic discharges and failing septic systems. The town of Charlemont will begin construction of a wastewater treatment facility in the spring of 1988. This plant will eliminate this pollution problem.

Water quality problems were also evident in the Green River in Greenfield. Dissolved oxygen concentrations were low, and nutrients and solids were high. At low flow conditions during the summer, odor problems have been reported. The impaired water quality is caused by the Greenfield WWTP discharge. Although the plant generally meets the limits in its permit, the Green River is a small stream which cannot provide adequate dilution and waste assimilation. This plant also becomes severely overloaded following storms, because of inflow and infiltration in the sewer system. The town of Greenfield is in facilities planning to upgrade and expand the plant. The discharge outfall will be moved to the Deerfield River as part of the project. The Deerfield River will be able to provide adequate dilution of the discharge.

Potential nonpoint pollution sources in the Deerfield River Basin include stormwater runoff, landfill leachate, agricultural runoff, and subsurface disposal. Surveys conducted by the Division to date, however, have not documented significant levels of pollutant loadings from any of these sources.

REFERENCES

Simpson, K.T. 1979. Deerfield River 1977 Water Quality Analysis. Massachusetts Division of Water Pollution Control, Westborough, Massachusetts. 88 pp.

Massachusetts Division of Water Pollution Control. 1982. Deerfield River Basin 1981 Wastewater Discharge Data. Westborough, Massachusetts. 19 pp.

Figure 11

DEERFIELD RIVER BASIN (33)

TABLE 9
DEERFIELD RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Deerfield River						
Vermont Line to Cold River, Charlemont	42.4-29.6	B/CWF	S	--	--	--
Cold River to Dam 4, Charlemont	29.6-19.7	B/CWF	S			
Dam 4, Charlemont to Connecticut River, Greenfield-Deerfield	19.7-0.0	B/WWF	S	--	--	--
North River						
Vermont line to Deerfield River, Charlemont-Shelburne	9.5-2.7 2.7-0.0	B/CWF/AD B/CWF	S	--	--	--
Green River						
Vermont line to Greenfield STP, Greenfield	14.0-0.5	B/CWF/AD	S	--	--	--
Greenfield STP to Deerfield River, Greenfield	0.5-0.0	B/CWF	PS	Nutrients Chlorine residual Solids	-Greenfield STP	-Upgrade plant and relocate outfall to Deerfield River.

TABLE 9 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
South River						
Outlet Ashfield Pond to Emmets Road, Ashfield	13.3-11.4	B/CWF/AD	NS	Fecal coliform bacteria Nutrients	-Untreated discharges from the town of Ashfield	-Treatment must be provided for Ashfield Center discharges.
Emmets Road, Ashfield to Deerfield River, Conway	11.4-0.0	B/CWF/AD	S	--	--	--

Miles Assessed: 79.2 mi
Miles Supporting Classification: 76.8 mi
Miles Partially Supporting Classification: 0.5 mi

FARMINGTON RIVER BASIN (31)

Description of the Watershed

The Farmington River drains an area of 602 square miles within Massachusetts and Connecticut. Approximately 149 square miles (25 percent) are located in southwestern Massachusetts between the Housatonic and Westfield River Basins.

A major portion of the 149 square miles drains the west branch of the Farmington River and its tributaries. The remaining area drains into pond and valley brooks, which form the east branch of the Farmington River, just below the state line in Connecticut. The terrain throughout the river basin is hilly with large, relatively flat areas occurring on the hill tops at about 1200 feet above mean sea level. These areas produce many small feeder streams to the main branches and their tributaries.

Two major tributaries are the Clam and Fall Rivers. Fall River is formed by Big Pond and Otis Reservoir. Flow in the river is regulated by Otis Reservoir which is used for storage and recreational activities. The United States Geological Survey operates a flow gage on the Fall River in Otis. This gage drains an area of 16.5 square miles and has an average discharge of 49 cubic feet per second. The headwaters of the Clam River are formed by many small streams in uninhabited mountain wilderness. The Clam River is joined by the Buck River about two miles above its confluence with the west branch of the Farmington River. This river is characterized by rapids created by an average fall of about 100 feet per mile.

Water Quality Conditions and Trends

No water quality surveys have been conducted in the Farmington River Basin since 1974. Data collected in the 1974 surveys showed very good water quality throughout the basin. The watershed is rural and there are no point source discharges in the basin. Water quality conditions are expected to continue to be very good.

Potential sources of nonpoint pollution in the Farmington River Basin include agricultural runoff, landfill leachate, and subsurface disposal. Nonpoint pollution is not considered a significant problem in the Farmington River Basin.

REFERENCES

Massachusetts Division of Water Pollution Control. 1975. The Farmington River: 1974 Water Quality Analysis and Water Quality Management Plan. Westborough, Massachusetts. 112 pp.

_____. 1975. The Farmington River: 1974 Water Quality Survey Data. Westborough, Massachusetts. 45 pp.

Figure 12

FARMINGTON RIVER BASIN

(31)

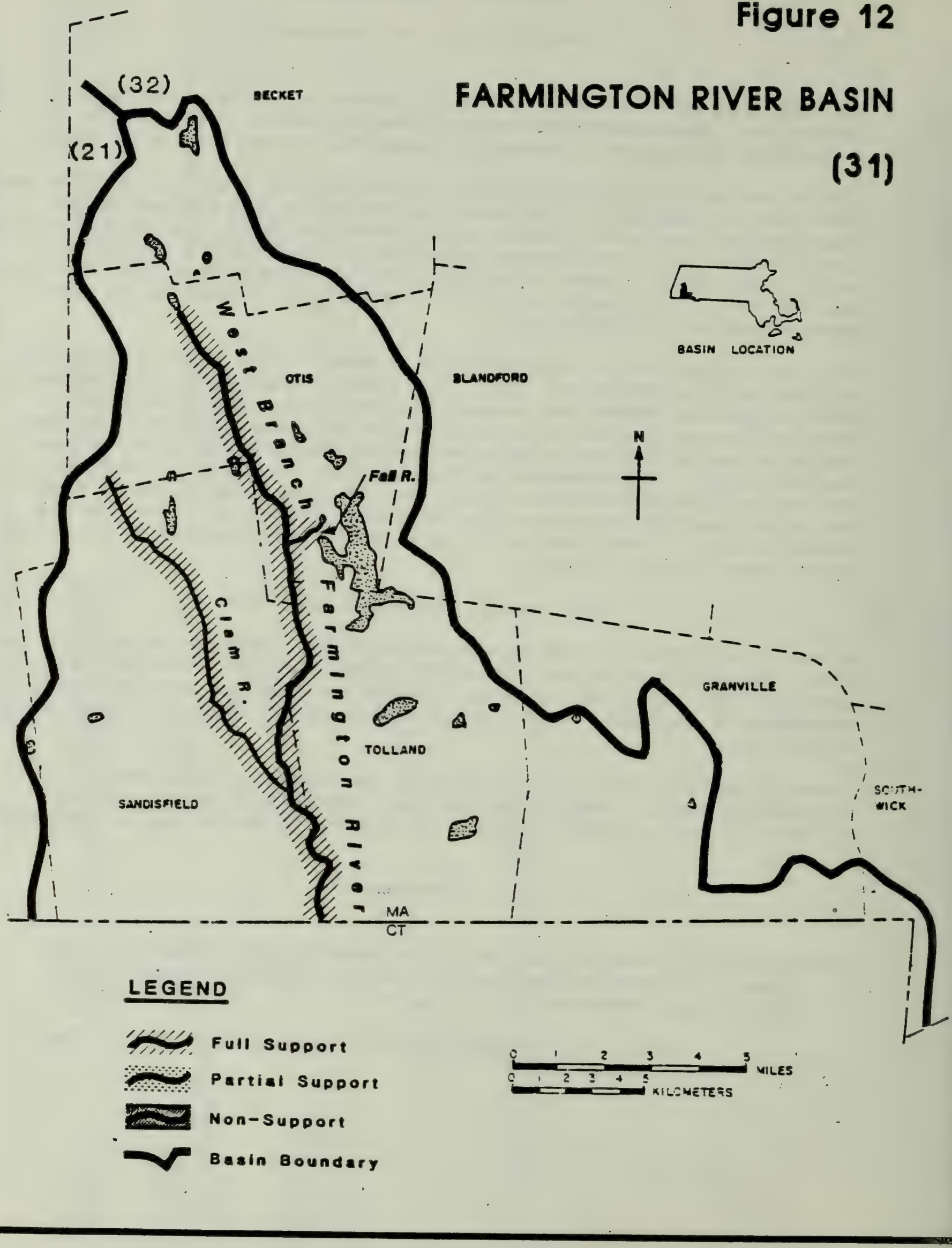


TABLE 10
FARMINGTON RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Farmington River						
West Branch from Becket to 1,000 ft. from Connecticut state line, Standisfield-Tolland	14.6-0.1	B/CWF/AD	S	--	--	--
West Branch 1,000 ft. upstream from state line to Connecticut state line	0.1-0.0	A/AD	S	--	--	--
Fall River from source to confluence with West Branch, Otis	1.0-0.0	B/CWF/AD	S	--	--	--
Clam River from source in Otis to confluence with West Branch, Sandisfield.	10.0-0.0	B/CWF/AD	S	--	--	--

Miles Assessed: 25.6 mi
Miles Supporting Classification: 25.6 mi
Miles Partially Supporting Classification: 0.0 mi

FRENCH RIVER BASIN (42)

Description of the Watershed

The French River is a major tributary of the Quinebaug River and extends 26 miles from its source in Greenville Pond, Leicester, to the confluence with the Quinebaug River in Thompson, Connecticut. From its headwaters at Sargent Pond, Leicester (this portion is known as Town Meadow Brook and extends from Sargent Pond to Greenville Pond) the French River flows generally south throughout its length through Oxford, Dudley, and Webster to Thompson, Connecticut. Probably the best known feature along the French River is Lake Chargoggagoggmanchaugagoggchaubunagungamaugg (also known as Webster Lake) which not only has the longest name but is also one of the largest natural lakes in the state. The lake drains to the French River via Mill Brook in Webster. Other tributaries discharging to the French River are generally small and include Burncoat, Bartons and Grindstone Brooks in Leicester; the Little River and Wellington Brook in Oxford; Potash Brook in Webster; and Backwater and Sunset Hill Brooks in Thompson. The Leicester, Oxford-Rochdale, Dudley, and Webster wastewater treatment plants discharge their effluents to the French River along with industrial discharges from Worcester Tool & Stamping in Leicester and non-contact cooling water from Asoma Polymer in Oxford.

Two major flood control dams were constructed in the French River Basin within Massachusetts by the U.S. Army Corps of Engineers following extensive flooding in 1955. These are the Hodges Village Dam on the French River and the Buffumville Dam on the Little River. The United States Geological Survey (USGS) maintains three flow gaging stations in Massachusetts in the French River watershed. The USGS gage located at Hodges Village drains an area of 31.0 square miles and its discharge has averaged 57 cubic feet per second (cfs) since 1962. The gaging stations located on the Little River and French River in Webster have average discharges of 50.1 cfs and 157 cfs and drain areas of 27.7 mi^2 and 85.3 mi^2, respectively. The periods of record are 45 years and 32 years, respectively.

Water Quality Conditions and Trends

Since the early 1800's the French River has been subjected to high loadings of oxygen demanding and nutrient laden pollutants. A large number of mills and factories sprang up in areas adjacent to the river in Oxford, Dudley and Webster. Today these towns remain industrialized with manufacturing of tool and die shops and cotton and rayon cloth printing and dyeing.

Water quality problems do exist in the French River. High nitrogen and phosphorus concentrations are still responsible for algal blooms and characteristic diurnal fluctuations of dissolved oxygen in Dutton Pond and the Perryville Impoundment, which are downstream of the Leicester WWTP and the Webster-Dudley WWTP's, respectively.

Water quality improvements to the French River have occurred due to the elimination of industrial discharges. River segments in Webster, Dudley and Rochdale have improved because discharges to the river from Anglo Fabrics, Cranston Print

Works, Webster Lens Company and Carleton Woolen have been eliminated. A new sludge handling facility at the Webster WWTP went on line in December 1985. This has eliminated much of the discharging of sludge to the Perryville impoundment. Further water quality improvements will be seen upon completion of the Leicester WWTP upgrading in 1988 (late spring, early summer).

An extensive EIS Study was conducted on ways to improve the water quality in the lower French River below the Webster and Dudley WWTP's. The Final Supplemental Environmental Impact Statement was published in January 1987. Recommendations were made for an advanced regional wastewater treatment plant, low flow augmentation from Buffumville Reservoir and sediment control in the three impoundments below the treatment plants.

The upgraded regional Webster-Dudley WWTP is scheduled to begin construction in 1988 and to be completed and go on line by 1990. The low flow augmentation has been approved and grant applications for sediment removal are being filled out.

REFERENCES

Smith, Jeffrey B. 1978. French and Quinebaug Rivers 1974 & 1976 Water Quality Analysis. Massachusetts Division of Water Pollution Control, Westborough, Massachusetts. 94 pp.

_____. 1980. The Quinebaug River 1980 Water Quality Survey Data. Westborough, Massachusetts. 63 pp.

_____. 1982. The French and Quinebaug River Basin, 1981 Water Quality Management Plan. Westborough, Massachusetts. 96 pp.

_____. 1982. French and Quinebaug River Basins Water Quality and Wastewater Discharge Survey Data. Westborough, Massachusetts. 61 pp.

_____. 1985. The French and Quinebaug Rivers 1984 and 1985 Water Quality and Wastewater Discharge Survey Data. Westborough, Massachusetts. 94 pp.

_____. 1987. The French Rivers 1987 Water Quality and Wastewater Discharge Survey Data. Westborough, Massachusetts. 75 pp.

U.S. Environmental Protection Agency. 1987. Final Environmental Impact Statement for the French River Clean-Up Program in Massachusetts and Connecticut. 392 pp.

Figure 13 FRENCH RIVER BASIN (42)

TABLE 11
FRENCH RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Town Meadow Brook						
Above Leicester WWTP, Leicester	27.7-27.3	B/SCWF/AD	S	--	--	--
Leicester WWTP to Greenville Pond, Oxford	27.3-24.8	B/SCWF	NS	Fecal coliform bacteria, D.O. Nutrients	-Leicester WWTP -Failing septic systems	-Proper operation and completion of the upgraded WWTP.
French River						
Greenville Pond, Leicester to North Oxford Dam, Oxford	24.8-19.3	B/WWF	PS	Fecal coliform bacteria, D.O. Nutrients	-Leicester WWTP -Oxford-Rochdale WWTP	-Upgrade both Leicester and Oxford-Rochdale WWTP's.
N. Oxford Dam to North Dam, Webster	19.3-10.0	B/WWF	S	--	--	--
North Dam, Webster to Webster-Dudley WWTP's	10.0-8.5	B/WWF	PS	Fecal coliform bacteria	-Urban runoff	-BMP
Webster-Dudley WWTP's to Connecticut state line	8.5-7.0	B/WWF	NS	Fecal coliform bacteria, Solids Nutrients, D.O.	-Webster WWTP -Dudley WWTP. -Sludge deposits	-Complete construction of the regional advanced WWTP for Webster and Dudley. -BMP for sludge deposits

TABLE 11 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Tributaries						
Burncoat Brook, Leicester	1.2-0.0	B/WWF/AD	S	--	--	--
Barton's Brook, Leicester	1.2-0.0	B/WWF/AD	S	--	--	--
Little River, Charlton and Oxford	9.1-0.0	B/SCWF/AD	S	--	--	--
Mill Brook, Webster	0.8-0.0	B/WWF/AD	NS	Metals	-Sediments	-Sediment from Cranston Print remains a problem.
Wellington Brook, Oxford	2.5-0.0	B/WWF/AD	PS	Fecal coliform bacteria	-Dairy farm	-Runoff control.

Miles Assessed: 35.5 mi
Miles Supporting Classification: 21.2 mi
Miles Partially Supporting Classification: 9.5 mi

HOOSIC RIVER BASIN (11)

Description of the Watershed

The Hoosic River Basin is located in the northwestern corner of Massachusetts and is part of the overall watershed which encompasses portions of the states of Vermont and New York as depicted in Figure 14. The entire watershed is 712 square miles of which 165 are located in the state of Massachusetts. The basin is largely rural, with clusters of population centers scattered about the basin. The Massachusetts portion is comprised of the north and south branches which join in the town of North Adams to form the beginnings of the main stem of the river. The Hoosic River is joined by several second and third order streams along its entire course.

Water Quality Conditions and Trends

The Massachusetts Division of Water Pollution Control extensively monitored the Hoosic River in 1985-86 in order to determine the water quality and biological integrity of the river system. The surveys included evaluation of the water column, sediment, point source wastewater discharges, hydraulic flow measurements, fish tissue analysis, and macroinvertebrate sampling. The multi-discipline program was necessary to determine the interaction among the various environmental components of the river's ecosystem and to attempt to determine the effect that past pollutant loadings were still having on the system. The river had a long history of pollutant problems which have been substantially abated over the past decade.

The findings from the recent surveys were quite positive. The pollutant loadings to the river were greatly reduced; for example, the BOD loadings to the river in 1973 were approximately 14,000 pounds per day while the loadings in 1985-86 were approximately 400 pounds per day. This reduction resulted in elevated dissolved oxygen levels that were not below 9.0 mg/l during any of the surveys. The heavy metals loadings, long a serious concern, were basically at or below detection limits and normally well below the water quality criteria established by the USEPA. The major problem was elevated bacteria levels typically associated with urban runoff. There was concern that past discharges of PCB's had contaminated portions of the river and were adversely affecting the in-stream biological population. The Division conducted extensive sediment and fish sampling programs in order to determine the existence and extent of the problem. The analysis of the sediment did indicate that one area of the stream had elevated PCB levels. This site was downstream of a known former discharger of PCB in the town of North Adams. The fish tissue analysis was inconclusive as to the presence of significant levels of PCB in that area. A single species of trout had very high levels of PCB while other fish (warm water species) showed lower levels than federal standards. The issue needs further investigation; the Division will conduct additional monitoring during 1988.

The Hoosic River water quality and biological integrity has greatly improved over the past decade. The river supports an active sport fishery and is widely used as a canoe/kayak watercourse. The river is not physically adapted for swimming - it is quite shallow and rocky; the bacteria levels do, at times,

exceed the standard for Class B waters. The river will fully support its uses when a sewer connection is made to a small area of the town of Clarksburg; when urban runoff control is implemented to the extent feasible; and when the PCB question is fully evaluated and abatement is implemented as necessary.

The impact of nonpoint sources upon the water quality of the Hoosic River originates from two main sources - urban runoff and infiltration, and dairy farm runoff. The former is typical of rivers which flow through urban centers and include exfiltration from sewer lines, stormwater inflow and contaminated groundwater flow from failing septic systems. These are potential problems in the Hoosic Basin and should be subject to future investigation. The dairy runoff occurs in the Green River Basin and could be reduced by the implementation of best management practices (BMPs). The runoff increases bacteria levels and adds some nutrients.

REFERENCES

Massachusetts Division of Water Pollution Control. 1975. Hoosic River Water Quality Management Plan. Westborough, Massachusetts. 67 pp.

_____. 1974. Hoosic River 1973 Water Quality Survey Data. Westborough, Massachusetts. 54 pp.

_____. 1978. The Hoosic River Part A Water Quality Data 1977-1978. Westborough, Massachusetts. 84 pp.

_____. 1982. Hoosic River Basin 1982 Water Quality Survey Data. Westborough, Massachusetts. 46 pp.

_____. 1985. Hoosic River Basin 1985 Water Quality Data. Westborough, Massachusetts. 52 pp.

_____. 1988. Hoosic River Basin 1986 Water Quality Report. Westborough, Massachusetts. (in preparation).

Figure14 HOOSIC RIVER BASIN (11)

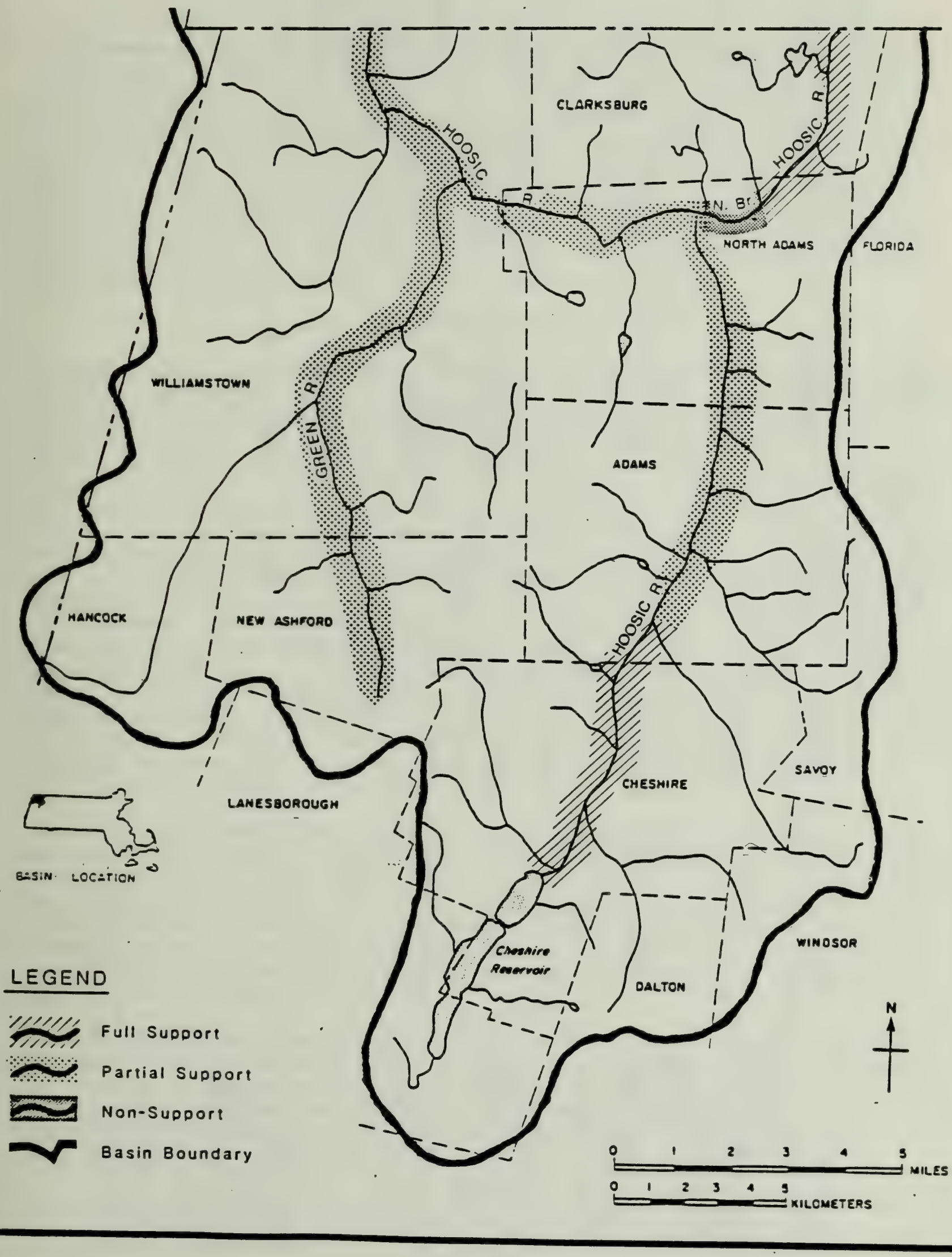


TABLE 12
HOOSIC RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Hoosic River						
North Branch Vermont line to USGS gage, N. Adams	5.6-1.8	B/CWF/AD	S	--	--	-- reference site.
North Branch USGS gage to South Branch, N. Adams	1.8-0.0	B/CWF/AD	NS	Fecal coliform bacteria	-Untreated sewage	-- WWTP.
South Branch Cheshire Reservoir to North Branch, N. Adams	21.5-15.4	B/CWF/AD	S(16.8)	--	--	--
	15.4-8.3	B/WWF	PS(from 16.8 to 8.3)	Fecal coliform bacteria	-Runoff	-BMPs
Main Branch to Vermont line	8.3-0.0	B/WWF	PS	Fecal coliform bacteria	-Upstream discharges -Runoff	-Stated above -BMPs -PCB's reduction -Studies being conducted.
Green River						
Headwaters, New Ashford to Hoosic River, Williamstown	10.8-0.0	B/CWF	PS	Fecal coliform	-Dairy runoff	-BMPs

Miles Assessed: 37.9 mi
Miles Supporting Classification: 8.5 mi
Miles Partially Supporting Classification: 27.6 mi

HOUSATONIC RIVER BASIN (21)

Description of the Watershed

The Housatonic River is located in western Massachusetts and the eastern portion of New York. The basin, as depicted in Figure 15, is substantial in size with a total drainage area of 1,945 square miles of which 545 square miles are located in Massachusetts. In its north to south flow pattern, the Housatonic River traverses 198 miles from its headwaters in Hinsdale, Massachusetts to its ultimate repository, Long Island Sound. The sixty-nine river miles in Massachusetts are characterized by a repeating sequence of a meandering river, impoundments and intermittent free-flowing stream segments. The river receives several treated industrial and domestic wastewater discharges which impact, to varying degrees, the water quality of the Housatonic River. The lower portion of the basin in Massachusetts is rural and comprised of several dairy farms.

Water Quality Conditions and Trends

The Massachusetts Division of Water Pollution Control conducted its most recent evaluation of the river and its major tributaries in 1985. The survey analyzed conventional water quality parameters (BOD, solids, nutrients), heavy metals, purgeable organics, and polychlorinated biphenyls (PCBs). One of the surveys in 1985 was planned to coincide with the vacation shut down of many of the industrial loadings to the river. The survey was a continuation of several surveys which the Division has conducted on the Housatonic River since the late 1960's. The river had been subjected to decades of significant pollutant loadings from numerous industries and municipalities. Beginning in the late 1960's, construction and upgrading of treatment facilities produced significant improvement in water quality and revitalized the indigenous biological population. However, the discovery of significant levels of PCBs throughout the river system and particularly in the upper portion near the city of Pittsfield, dealt a slashing blow to the environmental recovery of the Housatonic River. In addition, the river's numerous impoundments are eutrophic, particularly Woods Pond. An intensive remedial action plan for the containment and possible removal of the PCBs is being developed to reduce the migration and bioaccumulation of PCBs. An advisory warning against consumption of fish from the Housatonic River has been in effect on the river since 1983.

During the 1985 surveys, all dissolved oxygen measurements taken throughout the basin over three separate sampling days (>200 measurements) were in excess of the minimum standard of 5.0 mg/l. The fecal coliform levels were slightly above the standard (200 per 100 ml) at locations throughout the basin; however, the levels were not significantly high and may indicate nonpoint input. The water column heavy metals were low throughout the system, often at or below detection limits. PCB's were detected at the two stations downstream from the source of PCB (10.5 and 3.05 ug/l).

The Housatonic River water quality is within the assigned classification with the exception of minor bacteria level excursions. However, the presence of PCBs in the water column, sediment, and in-stream biota restrict the use of the river system to secondary recreation. The river is not physically suited for swimming, and fishing is limited to catch and release.

The Housatonic River has significant nonpoint source loadings, particularly from agricultural and dairy inputs and in very significant amounts in the lower section of the basin from the Ten Mile River in New York. The states of Massachusetts and Connecticut and the USEPA undertook an intensive monitoring program in 1981-82 to determine the impact of nutrient loadings to the river; particularly to the Housatonic lakes in central Connecticut. The results of the study indicated that there were significant nutrient loadings from runoff, large amounts following precipitation events. In addition, the study lead to the imposition of a phosphorus limit for the Pittsfield WWTP. Unfortunately, the trophic condition of the lakes has not improved, adding evidence to the dominance of nonpoint inputs to the water quality of the Housatonic River.

REFERENCES

Massachusetts Division of Water Pollution Control. 1975. Housatonic River Water Quality Management Plan. Westborough, Massachusetts. 90 pp.

_____. 1978. Housatonic River 1978 Water Quality Data. Westborough, Massachusetts. 138 pp.

_____. 1981. Housatonic River 1981 Water Quality Management Plan. Westborough, Massachusetts. 72 pp.

_____. 1981. 1981 Basin-Wide Phosphorus Sampling Data. Westborough, Massachusetts. 85 pp.

_____. Housatonic River 1985 Water Quality Data. Westborough, Massachusetts. (in preparation).

Figure 15 HOUSATONIC RIVER BASIN (21)

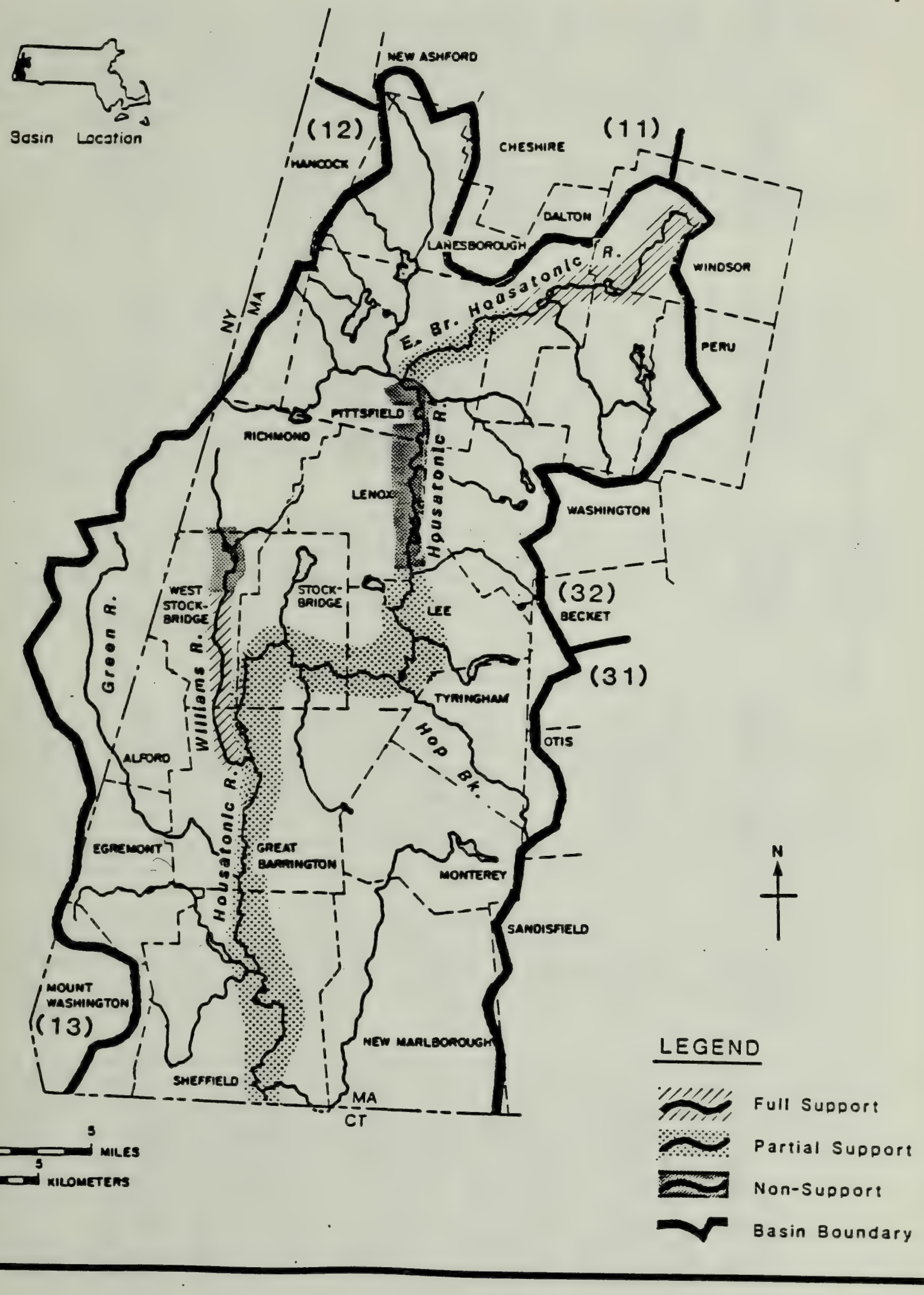


TABLE 13
HOUSATONIC RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Housatonic River						
East Branch headwaters to	13.6-5.5	B/CWF/AD	S	Fecal coliform bacteria	-Runoff -Subsurface	-BMPs -Data needed.
General Electric, Pittsfield	5.5-2.0	B/WWF			disposal	
East Branch General Electric to West Branch, Pittsfield	2.0-0.0	B/WWF	PS	Fecal coliform bacteria PCB's.	-Runoff -Industrial residual	-BMPs -Implement remedial action plan.
Main Branch confluence to Woods Pond outlet, Lee	55.4-45.1	B/WWF	NS	Fecal coliform bacteria PCB sediment contamination Eutrophication	-As above	-As above.
Main Branch outlet Woods Pond to Connecticut state line, Sheffield	45.1-0.0	B/WWF	PS	Fecal coliform bacteria PCB Eutrophication	-As above	-As above.
Williams River						
Source to West Stockbridge	10.5-8.6	B/CWF/AD	NS	Fecal coliform bacteria	-Untreated discharges in W. Stockbridge	-Construction of collection system and WWTP.
West Stockbridge to Housatonic River, Great Barrington	8.6-0.0	B/CWF/AD	S	--	--	--

Miles Assessed: 79.5 mi
Miles Supporting Classification: 20.2 mi
Miles Partially Supporting Classification: 47.1 mi

IPSWICH RIVER BASIN AND COASTAL DRAINAGE AREA (92)

Description of the Watershed

The Ipswich River Basin is located in northeastern Massachusetts and encompasses a drainage area of 155 square miles. All or part of 19 Massachusetts communities lie within the basin. The towns of Middleton, Topsfield, and North Reading lie completely within the basin, as do major portions of Boxford, Hamilton, North Andover, Reading, Wenham, and Wilmington.

The river rises in the town of Burlington and follows a meandering, northeasterly course to the town of Ipswich, where it drains into the Atlantic Ocean. The major tributaries to the Ipswich River are Martins Brook, Boston Brook, Fish Brook and the Miles River.

From its source to its mouth, the Ipswich River experiences a vertical fall of 115 feet, of which approximately 30 feet are taken up by the three dams on the river. At its mouth, the river has a total drainage area of 155 square miles with an average discharge of 249 cubic feet-per-second (cfs) to the Atlantic Ocean. The United States Geological Survey (USGS) maintains two flow gaging stations on the Ipswich River. One is located in south Middleton and the other is located downstream at the Willowdale Dam in Ipswich. The average discharge at the south Middleton gage is 62 cfs, while the average discharge at the Ipswich gage is 187 cfs.

The total stream discharge is affected by several water supply diversions which occur regularly during high flow periods and intermittently during low flow periods. Beverly, Lynn, Peabody and Salem divert water from the Ipswich River to augment their water supplies. In addition, twelve other towns have water rights to the Ipswich River.

Water Quality Conditions and Trends

The Ipswich River Basin is a significant water supply source for numerous communities in northeastern Massachusetts. Both groundwater and surface waters are utilized, which creates a critical interaction between the two sources. The base flow in the Ipswich River is derived mainly from the groundwater. During conditions of low stream flow, large withdrawals of groundwater can significantly lower the stream flow. On some occasions, groundwater withdrawal has completely depleted surface water flow in the central portion of the river.

Due to the significant demands upon the water resources of the Ipswich River Basin, regulations have been established to protect the river's water quality. The entire freshwater portion of the Ipswich River has been classified as antidegradation and is subject to Massachusetts Water Quality Standards Regulation 4.3, protection of low flow waters.

Within the boundaries of the Ipswich River Basin there are eleven wastewater dischargers which have NPDES discharge permits. The majority of the discharges are non-contact cooling water and are not considered to cause water quality problems. The town of Ipswich WWTP and Emhart Chemical Group/Bostik Division are the only dischargers in the basin which are classified as major. The

Ipswich WWTP, which discharges to a small tributary to the estuarine portion of the Ipswich River, was upgraded in 1976 and does not create water quality problems. Bostik Corporation in Middleton has a permit to discharge cooling water and stormwater only.

The Ipswich River and several of its tributaries are subject to depleted dissolved oxygen levels throughout its freshwater portion in the summer time. The cause is related to the wetland nature of the stream and the associated oxygen demands of the organic matter inherent in wetlands, as well as to the very low oxygen levels of the groundwater replenishing the stream. The condition is not the result of a point source discharge or other man-induced condition and, therefore, it is not a violation of the Commonwealth's water quality standards. The depressed dissolved oxygen levels may create a physiological stress for the aquatic fauna of these waters.

Nonpoint sources provide another potential pollutant flow to the Ipswich River. As the river flows through several small towns, it is subject to runoff and septic tank leachate. Neither of these water quality impacts are now considered serious; hence the river meets its assigned classification. In the future, however, increasing development pressures in the Ipswich Basin could endanger the water quality.

Coliform bacteria samples taken in the tidal portion of the river in Ipswich have been in excess of the Commonwealth's water quality standards. Sources of bacteria may be stormwater runoff, illegal discharges or sewage pipe leakage. However, shellfish harvested in the Ipswich River or in proximal estuarine beds are reported to have very low bacteria counts.

REFERENCES

Massachusetts Division of Water Pollution Control. 1977. The Ipswich and Parker Rivers, 1976, Part D - Water Quality Management Plan. Westborough, Massachusetts. 196 pp.

_____. 1979. Ipswich and Parker River Basins, 1978, Water Quality Survey Data. Westborough, Massachusetts. 93 pp.

_____. 1985. Ipswich River Basin, 1985, Water Quality Survey Data. Westborough, Massachusetts. 66 pp.

Sammel, E.A. et al. 1964. Synopsis of Water Resources of the Ipswich River Basin, Massachusetts. U.S. Geological Survey, Washington, D.C.

Figure 16 IPSWICH RIVER BASIN (92)

GEORGETOWN
ROWLEY
(91)
IPSWICH
(84)
Stiles Pond
Lowe Pond
Hood Pond
BOXFORD
Rye Bk.
Ipswich R.
NORTH ANDOVER
Fish Bk.
Norris Bk.
TOPSFIELD
ESSEX
HAMILTON
Miles R.
ANDOVER
WENHAM
MIDDLETON
Martins Pond
NORTH READING
MANCHESTER
BEVERLY
(83)
TEWKSBURY
(93)
WILMINGTON
Martins Bk.
Ipswich R.
DANVERS
Lubbers Bk.
BILLERICA
PEABODY
READING
LYNNFIELD
Maple Meadow Bk.
(71)
WOBURN
BURLINGTON

0 1 2 3 4 5 MILES
0 1 2 3 4 5 KILOMETERS

N

LEGEND

- Full Support
- Partial Support
- Non-Support
- Basin Boundary

TABLE 14
IPSWICH RIVER BASIN AND COASTAL DRAINAGE AREA

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
From its source in Wilmington to Sylvania Dam, Ipswich	36.6-4.5	B/SCWF/AD	S	Dissolved oxygen	-Natural wetland conditions.	--
Sylvania Dam, Ipswich to mouth in Ipswich Bay, Ipswich	4.5-0.0	SA	NS	-Total coliform bacteria, Shellfishing restricted	-Surface runoff. -Illegal connections or leakage into Farley Brook, Ipswich. -Untreated discharges.	--

Miles Assessed: 36.6 mi
Miles Supporting Classification: 32.1 mi
Miles Partially Supporting Classification: 4.5 mi

THE ISLANDS COASTAL DRAINAGE AREA (97)

Description of the Islands

The Islands drainage areas include those of Nantucket, Martha's Vineyard, and the Elizabeth Islands, all located off the southern coast of Cape Cod. These islands collectively exhibit similar geological patterns, water resources, and water quality problems. Ponds constitute the major type of surface freshwater resources and groundwater is the sole source of domestic water supply.

Elizabeth Islands (Dukes County). There are 15 islands in the Elizabeth Island chain, totaling some 8,300 acres. The islands are primarily moraine and contain approximately 65 permanent freshwater ponds. Most of the islands are grassy, with areas of low woods or shrub growth. All of the Elizabeth Island chain with the exception of Cuttyhunk and Penikese are owned by one family and managed in a trust. The town of Gosnold, which is located on Cuttyhunk, is the island chain's only year-round community.

Martha's Vineyard (Dukes County) is an island consisting of six towns with a total surface area of 105.9 square miles, 125 miles of coastline and a maximum elevation of 130 feet. It is the largest island off the coast of New England. The island's topography is extremely varied ranging from wide barrier beaches, coastal brackish ponds, outwash plains, rolling moraines and coastal scarpments. This diverse topography, with productive waters and proximity to bird migration routes, provides favorable habitat for a wide range of wildlife.

The Vineyard's water supply depends solely on several groundwater aquifers with rainfall as the only replenishing source.

Nantucket Island (Nantucket County) is an island comprising 49.5 square miles, 94 miles of coastline and a maximum elevation of about 100 feet. The island's glacial history has led to a mix of landforms including outwash plain, moraine, ponds and marshes. Soil composition is primarily silty sand, loam, peat and marsh with extensive sand deposits along the shoreline. In 1975 the entire island was included in the National Register because of the unique architecture and its historical value. In addition, all of the islands have been included under the Commonwealth's Ocean Sanctuaries Statutes, which prohibit the removal of sand or gravel, dumping, or new discharges of wastes.

Water Quality Conditions and Trends

All of the islands, but most particularly Martha's Vineyard, Nantucket and Cuttyhunk, experience large influxes of tourists during the summer months. These seasonal population booms place particular burdens on each island's limited water supply and waste disposal facilities.

With the summer resident population of Nantucket rapidly approaching 30,000, and an additional 500,000 tourists visiting each year, there are potential threats to surface water quality and groundwater. Potential impacts are from septic system leachate, landfill disposal of septage and solid wastes, and saltwater intrusion. Coastal waters are threatened by possible oil spills from tanker

traffic and by sanitary waste discharges from watercraft, particularly those moored in harbors.

There are no industrial wastewater discharges on Nantucket. A thermal discharge to Nantucket Harbor presently meets water quality standards. At the present time the island utilizes two sand beds for sanitary waste treatment. The town of Nantucket has received funding through the Commonwealth's construction grants program to build two primary treatment facilities with sludge handling at the villages of Surfside and Siasconset.

Potential water quality problems on Martha's Vineyard are similar to those on Nantucket and are related to heavy use of septic systems, landfill leachate, watercraft waste, stormwater runoff, and oil spillage. Presently there are two sanitary wastewater treatment plants on Martha's Vineyard, one of which discharges to a sand filter and the other to a leaching field. The town of Edgartown has applied for a construction grant to upgrade its wastewater treatment facility and add sewer extensions.

The towns of Tisbury and Oak Bluffs have recently notified the Commonwealth of their interest in developing municipal treatment facilities and both are in Phase I of facilities planning.

The island of Cuttyhunk in the town of Gosnold has two small untreated discharges to Vineyard Sound. The provisions of the federal Clean Water Act PL 92-500 as amended in 1977 requires the town to upgrade these facilities to secondary treatment levels or seek a waiver through the 301(h) waiver proceedings contained in that law. The town has obtained this waiver and will construct a primary treatment facility.

The existing data indicate that the freshwater resources of the islands to be generally of high quality. Problems, as described above, are associated with non-point sources. The most sensitive use of coastal waters other than for fish and wildlife propagation, is shellfish harvesting. The number of shellfish bed closures due to bacterial contamination has increased steadily over the past several years.

REFERENCES

MacConnel W., Swartout O., Stone J. 1984. Land Use Update for Cape Cod and the Islands with Area Statistics for 1951, 1971 and 1980. Research Bulletin Number 686. Massachusetts Agricultural Experiment Station, College of Food and Natural Resources, University of Massachusetts at Amherst. 77 pp.

Massachusetts Office of Coastal Zone Management 1977. Massachusetts Coastal Zone Management Plan, Volume II of 2. Chapter 5: Massachusetts Coastal Regions An Atlas of Resources. 231 pp.

Massachusetts Division of Water Pollution Control. 1974. Islands Water Quality Management Plan. Westborough, Massachusetts. 49 pp.

_____. 1975-1976. Martha's Vineyard Water Quality, Groundwater and Wastewater Discharge Survey Data. Westborough, Massachusetts. 69 pp.

_____. 1978. Nantucket Island Water Quality Study. Westborough, Massachusetts. 50 pp.

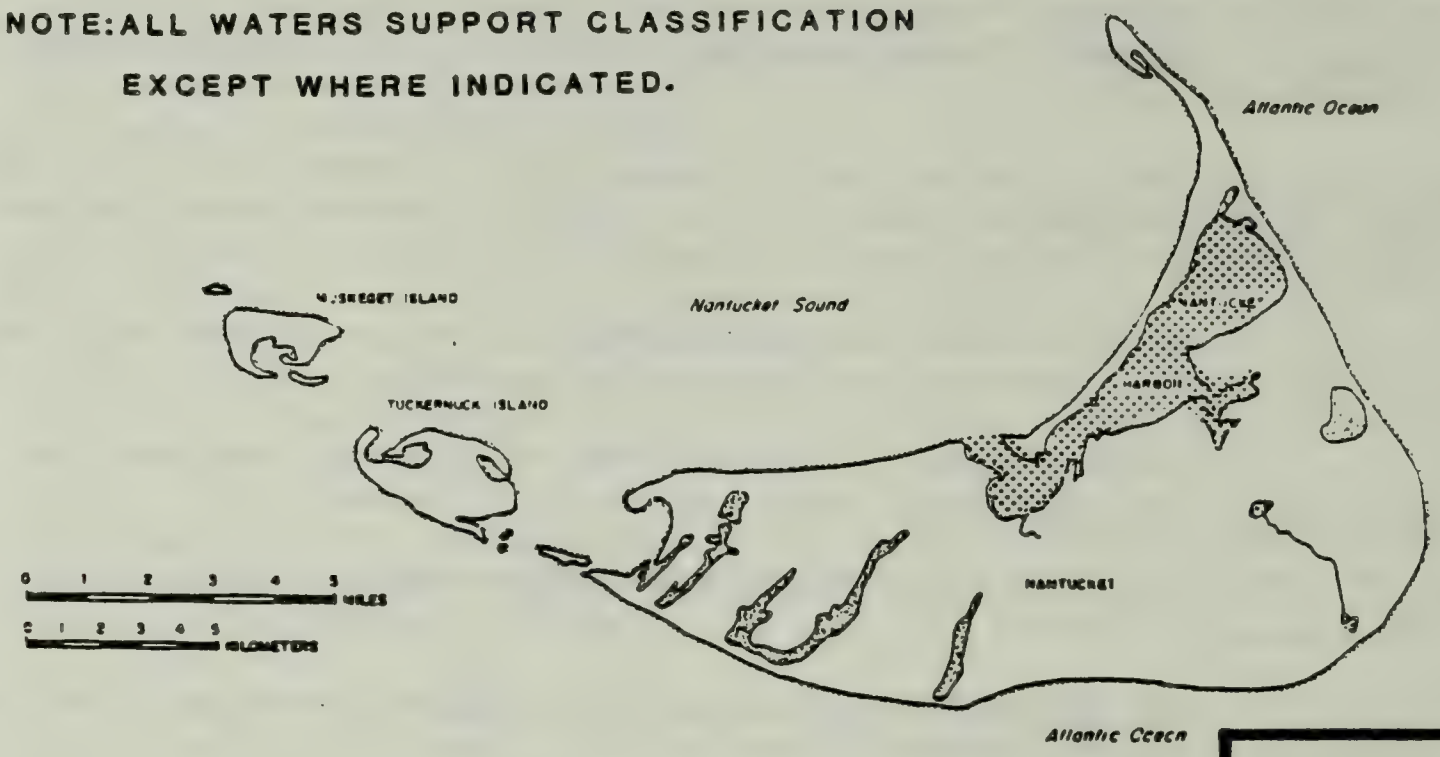
_____. 1984 Martha's Vineyard Part B Wastewater Discharge Survey Data. Westborough, Massachusetts. 22 pp.

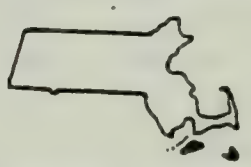
_____. 1987. Cape Cod and Islands 1986-1987 Part A: Salt Water Quality Survey Data. Westborough, Massachusetts. In preparation.

SP, Inc. 1987. Lagoon Pond Diagnostic/Feasibility Report. Draft Final Report. Salem, Massachusetts.

Figure 17 ISLANDS BASIN (97)

NOTE:ALL WATERS SUPPORT CLASSIFICATION EXCEPT WHERE INDICATED.





LEGEND

- Full Support
- Partial Support
- Non-Support
- Basin Boundary

NOTE:ALL WATERS SUPPORT CLASSIFICATION EXCEPT WHERE INDICATED

TABLE 15
THE ISLANDS COASTAL DRAINAGE AREA

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Nantucket						
Nantucket Harbor	7.65 mi^2	SA	PS	Fecal coliform bacteria	-Boats	-Improve pump out facilities at marinas. -Sealed head bylaws.
Sesachacha Pond	0.43 mi^2	SA	S	--	--	--
Coskata Pond	0.07 mi^2	SA	S	--	--	--
Great Point Pond	--	SA	S	--	--	--
Martha's Vineyard						
Chilmark Pond	0.18 mi^2	SA	S	--	--	--
Menemsha Pond	0.99 mi^2	SA	PS	Fecal coliform bacteria	-Failing septic systems -Boats	-Proper maintenance of sub-surface disposal. -Improve pump out facilities. -Sealed head bylaws.
Oak Bluffs Harbor	0.05 mi^2	SA	PS	Fecal coliform bacteria	-Boats	-Improve on-shore pump out facilities.
Cape Poge Bay	2.24 mi^2	SA	S	--	--	--
Vineyard Haven Harbor	2.60 mi^2	SA/AD	PS	Fecal coliform bacteria Shellfish bans	-Boats	-Improve on-shore pump out facilities.
Sengekontacket Pond	1.57 mi^2	SA/AD	PS	Fecal coliform bacteria	-Failing septic systems	-Septic system maintenance

TABLE 15 (CONTINUED)

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Lagoon Pond	0.75 mi^2	SA/AD	PS	Fecal coliform bacteria Nutrients	-Failing septic systems -Road runoff	-Septic system maintenance. -Best management practices.
Lake Tashmoo	0.36 mi^2	SA/AD	S	--	--	--
Oyster Pond	0.19 mi^2	SA/AD	S	--	--	--
Mattakeset Bay	--	SA/AD	S	--	--	--
Edgartown Harbor	1.09 mi^2	SA/AD	PS	Fecal coliform bacteria, Shell-fish bans	-Boats	-Build on-shore pump out facilities.
Katama Bay	2.60 mi^2	SA/AD	S	--	--	--
Edgartown Great Pond	1.30 mi^2	SA/AD	PS	Fecal coliform bacteria	Waterfowl	-Best management practices.
Tisbury Great Pond	1.2 mi^2	SA/AD	PS	Fecal coliform bacteria, Shell-fish bans	-Failing septic systems	-Septic system maintenance.
Eliazbeth Islands						
Cuttyhunk Pond		SA/AD	PS	Fecal coliform bacteria, Shell-fish bans	-Failing septic systems -Boats	-Tie into municipal treatment facility. -Sealed head bylaws.
West End Pond	0.10 mi^2	SA/AD	S	--	--	--

Square Miles Assessed: 23.37 mi^2
Square Miles Supporting Classification: 6.17 mi^2
Square Miles Partially Supporting Classification: 17.2 mi^2

MERRIMACK RIVER BASIN AND COASTAL DRAINAGE AREA (84a)

Description of the Watershed

The Merrimack River is formed in Franklin, New Hampshire at the confluence of the Pemigewasset and Winnipesaukee Rivers. It flows southward for 78 miles through the central portion of New Hampshire and into Massachusetts. Near the city of Lowell, Massachusetts the river turns to the northeast and flows 38 miles to the city of Newburyport where it empties into the Atlantic Ocean. The Merrimack River drainage basin, fourth largest in New England, is comprised of a total of 5,010 square miles in New Hampshire and Massachusetts. Only 24 percent, or approximately 1,200 square miles, of the watershed is located within the Commonwealth of Massachusetts.

From the state line to the Merrimack estuary, a distance of 50 miles, the river drops 90 feet in elevation. This drop includes flow over major dams in the cities of Lowell and Lawrence which also marks the location of significant flow diversions through extensive canal systems. The United States Geological Survey (USGS) maintains a flow monitor on the Merrimack River at Lowell. The average discharge at this gage over 10 years of record is 7,529 cubic feet-per-second (cfs) and the seven-day, ten-year low flow is approximately 930 cfs.

Major sub-watersheds within the Massachusetts portion of the Merrimack River drainage basin are the Nashua (530 mi^2), Stony Brook (51 mi^2), SuAsCo (406 mi^2), and Shawsheen (72 mi^2). Other smaller tributaries include Beaver Brook, Spicket River, Little River, and Powwow River.

The maximum length of the Merrimack estuary is nine miles. It drains a total of 4,208 acres of salt marsh. The surface area of the estuary at mean low water is 3.29 mi^2. At mean high water the surface area is 6.18 mi^2 and the total volume is 1.884×10^9 cubic feet. The effects of the ocean tides extend 22 miles upstream to Haverhill.

Water Quality Conditions and Trends

For many years prior to the late 1970's the water quality of the mainstem Merrimack River in Massachusetts was adversely impacted by a number of pollution sources. These included large volumes of untreated sewage that were released to the river in the cities of Lowell, Lawrence, and Haverhill, and the addition of contaminants from polluted tributaries such as the Nashua River which flows into the Merrimack River in Nashua, New Hampshire. An estimated BOD_5 loading of from 65-75 thousand pounds-per-day was discharged directly to the Merrimack from the three cities mentioned above.

Despite heavy organic loadings to the river from the larger cities in New Hampshire and Massachusetts, the Merrimack River did not exhibit severe dissolved oxygen depletion during most times of the year primarily due to the large amount of flow that served to dilute incoming wastes. During summer months when flow in the river was much lower, dissolved oxygen concentrations violated water quality standards. Furthermore, concentrations of plant nutrients, such as nitrogen and phosphorus, and coliform bacteria counts were

high. The presence of elevated concentrations of nitrogen and phosphorus in the water contributed to a significant diurnal dissolved oxygen fluctuation.

One of the most devastating impacts resulting from water quality degradation of the Merrimack River was destruction of the shellfish industry located in the estuary. A report published jointly by the Massachusetts Department of Environmental Quality Engineering (MDEQE) and the Merrimack Valley Planning Commission describes the tidal flats of the Merrimack River Estuary and presents a historical record of their annual production. The flats comprise a total of over 850 acres which, at the turn of the century, were yielding almost 100,000 bushels of soft shell clams annually. Worsening water quality conditions in the Merrimack River led to closure of some shellfish flats as early as 1925. By the 1950's and 60's, annual production had decreased to a few hundred bushels, making the shellfish industry virtually non-existent in the Merrimack estuary.

By the early 1960's, poor water quality conditions were severely limiting the beneficial uses of the Merrimack River. As a result, a program was initiated to ameliorate water pollution problems in the river. Environmental legislation such as the Federal Water Pollution Control Act provided funding for the construction of municipal wastewater treatment facilities and the elimination of direct river discharges of untreated sewage or industrial wastes. Today, secondary wastewater treatment facilities are operating in Lowell, Lawrence, Haverhill, Amesbury, Newburyport and Merrimac. BOD_5 loadings from Lowell, Lawrence, and Haverhill are estimated to have been reduced by 80 percent from earlier loadings. Construction of a treatment facility will soon begin in the town of Salisbury. Finally, in Nashua, NH, the Nashua WWTP, only a few miles from the Massachusetts border, is scheduled to be upgraded from primary to secondary treatment by 1990.

Water quality improvements resulting from the construction of wastewater treatment facilities are readily apparent upon examination of 1979, 1981 and 1986 water quality survey data. Dissolved oxygen content in the river is now considerably better than in past years. Furthermore, coliform bacteria counts have decreased significantly in segments of the river immediately downstream from urban areas. However, violations of the fecal coliform bacteria water quality standard remain a major water quality problem on the river today.

Some shellfish beds in the Merrimack River estuary are now being harvested on a restricted seasonal basis. However, over the past year the entire area has been closed to shellfishing.

Nonpoint sources of pollutant loading to the Merrimack River are difficult to quantify and are probably masked by point source inputs. Violations of the water quality standards, particularly fecal coliform bacteria, are much more likely the result of point source inputs, such as CSO's, than nonpoint. However, since the Merrimack River flows through highly urbanized areas, with major highway crossings, urban runoff problems are likely, although at present unquantified.

Water quality problems do still exist in the Merrimack River. Whereas oxygen demand has been drastically reduced, nutrients are still present in concentrations which promote the growth of phytoplankton. Nitrogen and phosphorus from

upstream sources concentrate in the impoundment behind the Essex Dam in Lawrence, causing algal blooms in the summer months. The major sources of pollutant loading today in the lower Merrimack River are combined sewer overflows (CSOs) in the old urban centers of Lowell, Lawrence and Haverhill, as well as effluent discharges from the Nashua, NH; Lowell, Lawrence, and Haverhill WWTP's; and the industrial discharge in Nashua, NH - the W.R. Grace Co. In addition, untreated sewage is released to the Merrimack River in portions of Lowell that still remain to be connected to the new wastewater treatment plant at Duck Island. The CSOs and untreated discharges are indicated mainly by high coliform bacteria counts downstream from the three aforementioned cities. Bacteria levels steadily decrease downstream from the city of Haverhill due to both natural die-off and dilution. Despite the existence of a number of local sources of pollution around the Merrimack estuary, such as sewage loadings to Black Rock Creek in Salisbury, the impacts on water quality of pollutants originating upstream are lessened by the flushing action of the tides.

Selected toxic pollutants were analyzed in 1986 in the Merrimack River's water column, sediment, and biota. The data base collected for heavy metals is fairly extensive. However, testing for the multiplicity of synthetic organic compounds was limited to those which might reasonably be expected to be present in a given media.

The concentrations of lead, copper, and mercury were, at times, found in concentrations exceeding the EPA in-stream chronic criteria. In addition, sampling by the U.S. Fish and Wildlife Service indicate that resident fish (white sucker) whole body tissue levels of lead, copper, mercury, and cadmium, exceeded the National 85th percentile levels for these metals. Organo-chlorine pesticides were not detected in any river sediments, and PCB's were detected in low levels at only one estuary location.

Major tributaries to the Merrimack River in Massachusetts are the Nashua, Shawsheen and Concord Rivers and Stony Brook, which are treated in separate sections of this report. Smaller tributaries for which water quality data are available are described below.

Moderately high coliform bacteria levels are occasionally exhibited in Beaver Brook in Lowell. They are the result of untreated wastewater discharges in Dracut and Lowell. Dissolved oxygen depletion, however, is minimized by the reaeration characteristics of Beaver Brook.

The Spicket River exhibits elevated bacteria counts, and increased nutrient levels from municipal and industrial discharges in Salem, New Hampshire and Lawrence, Massachusetts. Nine (9) CSO's on the Spicket River are expected to be tied into the Greater Lawrence WWTP by 1988.

Due to its low flow characteristics and many wastewater discharges, the Little River (Haverhill) has exhibited water quality problems in the past. At times dissolved oxygen concentrations fell to 0.0 mg/l just upstream from the confluence with the Merrimack River. Solids content, turbidity, and color values were often very high. Recent data on the Little River are not available.

Class B standards violations especially for fecal coliform bacteria occur in the Powwow River as the result of urban runoff and municipal and industrial

discharges in Amesbury center. The town is currently studying inflow and its infiltration problems in the sewerage system to help eliminate excessive flow rates to the WWTP.

REFERENCES

Carr, Kenneth. 1984. "A Survey of Priority Pollutants in Merrimack and Connecticut River Fish." U.S. Fish and Wildlife Service, Ecological Services, Concord, N.H.

Hanley, Nora E. 1987. Merrimack River 1986 Water Quality Data, Wastewater Discharge Data, Selected Biological Data, and Water Quality Analysis. Massachusetts Division of Water Pollution Control. Westborough, Massachusetts. 136 pp.

Johnson, A.S. 1985. A Report on Water Quality Conditions and Pollution Abatement in the Merrimack River Basin in Massachusetts. Westborough, Massachusetts. 140 pp.

Massachusetts Division of Water Pollution Control. 1980. The Merrimack River Basin 1979 Water Quality Survey Data, Wastewater Discharge Data, Non-point Source Sampling Data. Westborough, Massachusetts. 125 pp..

_____. 1982. The Merrimack River 1981 Water Quality Survey Data, Wastewater Discharge Data. Westborough, Massachusetts. 102 pp.

Figure18

NH
MA

0 1 2 MILES
0 1 2 KILOMETERS

Powwow R.

Black Rock Cr.

S.Br. Souhegan R.

ASHBY

ASHBURNHAM

(35)

(81)

(93)

SALISBURY

AMESBURY

Little R.

MERRIMAC

NEWBURYPORT

HAVERHILL

WEST NEWBURY

NEWBURY

(91)

Spicket R.

Merrimack R.

GROVELAND

GEORGETOWN

METHUEN

Cow Pond Bk.

Beaver Bk.

TYNGSBOROUGH

DUNSTABLE

DRACUT

BOXFORD

LAWRENCE

NORTH ANDOVER

ANDOVER

(81)

(83)

GROTON

LOWELL

TEWKSBURY

CHELMSFORD

AYER

WESTFORD

LITTLETON

N

MERRIMACK RIVER BASIN (84a)

0 5 MILES
0 5 KILOMETERS

LEGEND

- Full Support
- Partial Support
- Non-Support
- Basin Boundary

TABLE 16
MERRIMACK RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Merrimack River						
MA-NH line to Tyngsborough Bridge, Tyngsborough	49.8-47.4	B/WWF	NS	Fecal coliform bacteria	-NH discharges	-City of Nashua WWTP upgrading from primary to secondary treatment. Design is complete. Expected plant completion in 1990.
Tyngsborough Bridge to Pawtucket Dam, Lowell	47.4-40.6	B/WWF	NS	Fecal coliform bacteria Lead	-NH discharges	-Nashua WWTP upgrade. -Further research needed to confirm and locate sources of metal contamination.
Pawtucket Dam to Essex Dam, Lawrence	40.6-29.0	B/WWF	NS	Fecal coliform bacteria	-Combined sewer overflows and untreated discharges in Lowell	-Limited planning and specification work has begun on combined sewer overflow abatement in Lowell. Dry weather flows to be tied by 1988.
				Mercury, Lead Copper	-Upstream discharges	-Further research needed to confirm and locate sources of metal contamination.

TABLE 16 (CONTINUED).

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Essex Dam to Little River, Haverhill	29.0-21.9	B/WWF	NS	Fecal coliform bacteria	-Upstream discharges. Combined sewer overflows in Lawrence	-Combined sewer overflows to be eliminated pending adequate funding. Spicket River Interceptor to be tied in to Lawrence WWTP. Expected completion in 1988.
				Lead	-Upstream discharges	-Further research needed to confirm and locate sources of metal contamination.
Little River to Rocks Bridge, Haverhill-West Newbury	21.9-11.8	SB	NS	Fecal coliform bacteria	-Upstream discharges. Combined sewer overflows in Haverhill	-Combined sewer overflows to be eliminated pending adequate funding. Little River Interceptor study has been funded.
				Lead	-Upstream discharge	-Further research needed to confirm and locate sources of metal contamination.
Rocks Bridge to Routes 1 and 1A Bridge, Newburyport	11.8-3.0	SB	PS	Fecal coliform bacteria	-Upstream sources	--
				Lead		-Further research needed to confirm and locate sources of metal contamination.

TABLE 16 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Routes 1 and 1A Bridge to the Atlantic Ocean, Newburyport	3.0-0.0	SB	NS	Fecal coliform bacteria Shellfishing banned	-Untreated wastewater discharges in Salisbury. -Upstream sources	-Plans and specifications complete for Salisbury secondary WWTP. Expected plant completion in 1989.
Beaver Brook, MA portion, Dracut/ Lowell	4.2-0.0	B/SCWF/AD	PS	Fecal coliform bacteria	-Untreated discharges in Lowell	-Tie in Beaver Brook discharges to Lowell WWTP. Expected completion in 1987.
Spicket River, MA portion, Lawrence	6.4-2.8 2.8-0.0	B/SCWF/AD B/WWF/AD	NS	Fecal coliform bacteria Phosphorus	-Untreated discharges in Salem, NH, and Lawrence. -Industrial discharge.	-Spicket River Interceptor to tie into Greater Lawrence WWTP. Expected completion in 1988.
				Copper Lead	-Upstream sources	-Further research needed to confirm and locate sources of metal contamination.
Little River, MA portion, Haverhill	4.3-0.0	B/SCWF/AD	NS	Dissolved oxygen, Solids Fecal Coliform bacteria	-Untreated discharges in Plaistow, NH and Haverhill. -Combined sewer overflows in Haverhill.	-Little River improvements. Preliminary planning completed for Little River Interceptor CSO and pretreatment.

TABLE 16 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Powwow River, MA portion, Merrimac	6.4-1.3 1.3-0.0	B/SCWF/AD SB	NS	Fecal coliform bacteria Lead	-Untreated discharges in Amesbury center. -Upstream sources	-Sewage systems expansion and improvement in Amesbury. -Further research needed to confirm and locate sources of metal contamination.
Black Rock Creek, entire length, Salisbury	1.7-0.0	SB/AD	NS	Dissolved oxygen, Fecal coliform bacteria, Solids	-Untreated and partially treated municipal discharges in Salisbury.	-Salisbury has recently been awarded a construction grant to fund a WWTP. Expected plant completion is in 1989.

Miles Assessed: 72.8 mi
Miles Supporting Classification: 0.0 mi
Miles Partially Supporting Classification: 13.0 mi

MILLERS RIVER BASIN (35)

Description of the Watershed

The Millers River Basin is located in north central Massachusetts and southeastern New Hampshire. The river is formed in Winchendon, Massachusetts by the confluence of the north and main branches. The river travels in a westward direction through the communities of Templeton, Royalston, Athol, Orange, Erving, and Montague. The confluence of the Millers River with the Connecticut River is in Gill. The total drainage area of the Millers River is 390 square miles, of which 350 square miles are in Massachusetts. The average flow of the Millers River at its confluence with the Connecticut River is 620 cfs.

Major tributaries of the Millers River are the Otter River, which joins the Millers in Winchendon, and the Tully River, which joins the Millers in Athol. The Tully and Millers Rivers have been considered potential sources for water supply.

The watershed of the Millers River is very hilly, and contains many tracts of forested land. The basin is mostly rural, with areas of moderate development. The population of the Millers River Basin is approximately 57,000. The major industries of the region are located in the larger towns of Athol and Orange, and in the city of Gardner. Traditionally, paper products, furniture, and tool making have been the major industries in the basin. In recent years, however, many of these companies have relocated or gone out of business.

Water Quality Conditions and Trends

Segments of the Millers River and the Otter River were among the most severely polluted river reaches in the Commonwealth during the 1960's and through the mid 1970's. Although problems still exist in some areas, the overall water quality in the basin has improved greatly. The Technical Services Branch has sampled water quality extensively in the Millers River Basin. The most recent survey was conducted in 1987. This survey included river chemistry, discharge monitoring, biological assessments, and toxicity testing. Preliminary analysis of the data shows that much of the river meets the Class B standards for water quality.

The remaining water quality problems on the main stem of the Millers River occur episodically in three river segments. Portions of the river in Winchendon have high bacteria levels caused by problems with the sewer system. In south Royalston, the segment below the Otter River confluence becomes degraded when Otter River water quality is poor. Solids and nutrient levels are elevated, and odor problems can occur. In Erving, the portion of the river below the Erving Wastewater Treatment Plant experiences impaired water quality when the plant has operating problems. Solids concentrations in the river rise, and foaming can occur.

The entire length of the Otter River has periodic violations of the standard for dissolved oxygen, and has high nutrient levels. Water quality problems above the first discharge, the Gardner WWTP, are caused by natural conditions, whereas downstream problems are caused by the large volume of wastewater being released

by three treatment facilities to a small stream with a low assimilative capacity. The existing water quality of the Otter River will be improved by two abatement projects. The Gardner WWTP is currently being upgraded to advanced treatment. Seaman Paper Company has installed biological treatment for its paper wastes. This facility is still experiencing start-up problems. When the plant is operating properly, the pollutant load from this facility will be reduced significantly.

In 1986, the Technical Services Branch analyzed the tissue of fish from the Millers River. The analyses showed elevated concentrations of PCBs in some of the fish. Additional fish samples were collected as part of the 1987 surveys, in order to further evaluate the extent of the contamination. This work confirmed that PCB is present in significant levels in Millers River fishes. Additional work will be conducted by the TSB in 1988 to determine the source of PCB.

The most important nonpoint pollution source in the Millers River Basin is acid precipitation. Because of the geology of the basin, the surface waters have a low natural buffering capacity. Streams in the Millers are among the most affected in the state by acid rain. Runoff from Route 2 is a potential source of nonpoint pollution for the lower portion of the watershed. However, this has not been evaluated by the Division.

REFERENCES

Massachusetts Division of Water Pollution Control. 1974. Millers River Basin Water Quality Management Plan. Westborough, Massachusetts. 74 pp.

_____. 1980. Millers River 1979 Water Quality Data. Westborough, Massachusetts. 103 pp.

_____. 1980. Millers River 1980 Water Quality Data. Westborough, Massachusetts. 79 pp.

_____. 1983. Millers River 1981 Water Quality Data. Westborough, Massachusetts. 55 pp.

_____. 1983. Millers River 1982 Water Quality Data and Wastewater Discharge Survey. Westborough, Massachusetts. 63 pp.

_____. Millers River 1985 Water Quality Data and Wastewater Discharge Survey. Westborough, Massachusetts. 61 pp.

_____. 1987. Millers River 1987 Water Quality Data. Westborough, Massachusetts. (in preparation).

Figure 19 MILLERS RIVER BASIN (35)

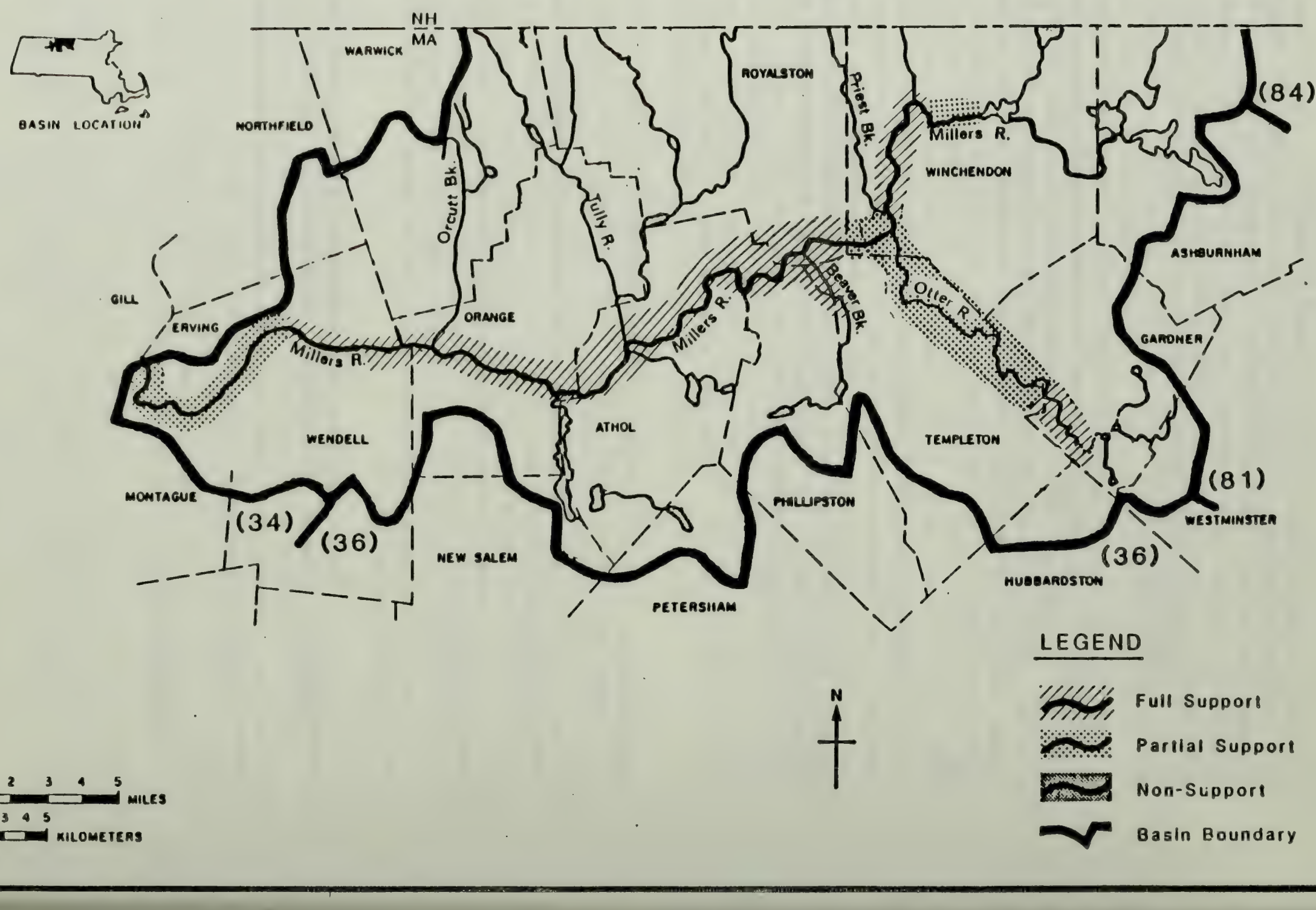


TABLE 17
MILLERS RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Millers River						
Above Winchendon WWTP, Winchendon	above 35.7	B/CWF/AD	PS	Fecal coliform bacteria	-Combined sewer discharges in Winchendon	-Sewer system rehabilitation in Winchendon.
Winchendon WWTP to Otter River, South Royalston	35.7-30.4	B/WWF	S	--	--	--
Otter River to South Royalston USGS Gage, South Royalston	30.4-25.6	B/WWF	PS	Dissolved oxygen Solids, Nutrients	-Otter River	-Upgrade treatment at discharges to Otter River.
South Royalston USGS Gage to Erving Paper Company, Erving	25.6-8.1	B/WWF	S	--	--	--
Erving Paper Company to confluence with Connecticut River, Erving	8.1-0.0	B/WWF	PS	Solids	-Operational problems at Erving Paper Co.	-Eliminate operational problems.

TABLE 17 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Otter River						
Source to Gardner WWTP, Gardner	12.2-9.6	B/AL/AD	S	Dissolved oxygen	-Naturally occurring low D.O. due to wetlands.	--
Gardner WWTP to confluence with Millers River, Winchendon	9.6-0.0	B/AL	PS	Dissolved oxygen Nutrients Solids	-Gardner WWTP. Operational problems at Templeton WWTP and Seaman Paper Co.	-Advanced treatment at Gardner. Eliminate operational problems at Seaman Paper Co. and Templeton.
Fernald School discharge to Millers River, Royalston	3.1-0.0	B/CWF	S	--	--	--

Miles Assessed: 51.0 mi
Miles Supporting Classification: 28.5 mi
Miles Partially Supporting Classification: 22.5 mi

MOUNT HOPE BAY DRAINAGE SYSTEM (61)

Description of the Watershed

Mount Hope Bay is located at the outlet of the Taunton River and is part of the Narragansett Bay. This area encompasses sections of the towns of Rehoboth, Swansea, Dighton, Somerset, Fall River and Westport. The Lee and Cole Rivers typically have low flows due to their small drainage areas and both are subject to tidal influences.

Water Quality Conditions and Trends

Fall River is a large industrialized community that has an extensive sewer system and a high volume wastewater treatment facility. Construction to expand and upgrade the primary treatment plant discharging to Mount Hope Bay was completed in 1983, which reduced organic loadings from the plant by approximately 80 percent. However, violations of class SB water quality criteria for bacteria have consistently occurred due to combined sewer overflows (CSO) to Mount Hope Bay and the Quequechan River. These violations occur during both wet and dry weather flows. Fall River is preparing a facility plan to develop remedial action plans for the CSO problem.

The Lee and Cole Rivers in Swansea have experienced water quality problems due to excess fecal coliform bacteria counts, especially after storm events. The bacteria originate from failing subsurface disposal systems and possible exfiltration from sanitary sewers. The high levels of bacteria have caused conditional and total closures of shellfish beds in the estuary of these rivers.

The publication of water quality data, water quality analysis reports, and a water quality management plan for Mount Hope Bay have been included in the Taunton River Basin. These reports include reference to Mount Hope Bay.

The impact of nonpoint sources upon the water quality of the Mount Hope Bay basin are typical of urban drainage systems, particularly those associated with combined sewers in the collection systems. The major impacts are on the closing of shellfish beds in the basin.

REFERENCES

Massachusetts Division of Water Pollution Control. 1970. Lower Taunton River Basin Water Quality Survey Data. Westborough, Massachusetts. 83 pp.

_____. 1975. Taunton River Basin Water Quality Survey Data. Westborough, Massachusetts. 225 pp.

_____. 1975. Taunton River Basin Water Quality Analysis. Westborough, Massachusetts. 150 pp.

_____. 1975. Taunton River Basin Water Quality Management Plan. Westborough, Massachusetts. 134 pp.

_____. 1981. Lower Taunton River Basin Water Quality and Wastewater Discharge Survey Data. Westborough, Massachusetts. 53 pp.

_____. 1981. Taunton River Basin Water Quality Management Plan. Westborough, Massachusetts. 74 pp.

_____. 1983. Lee and Cole River Basin Water Quality Survey Data. Westborough, Massachusetts. Unpublished.

_____. 1983. Quequechan River Water Quality Survey Data. Westborough, Massachusetts. Unpublished.

Figure 20

MOUNT HOPE BAY DRAINAGE AREA

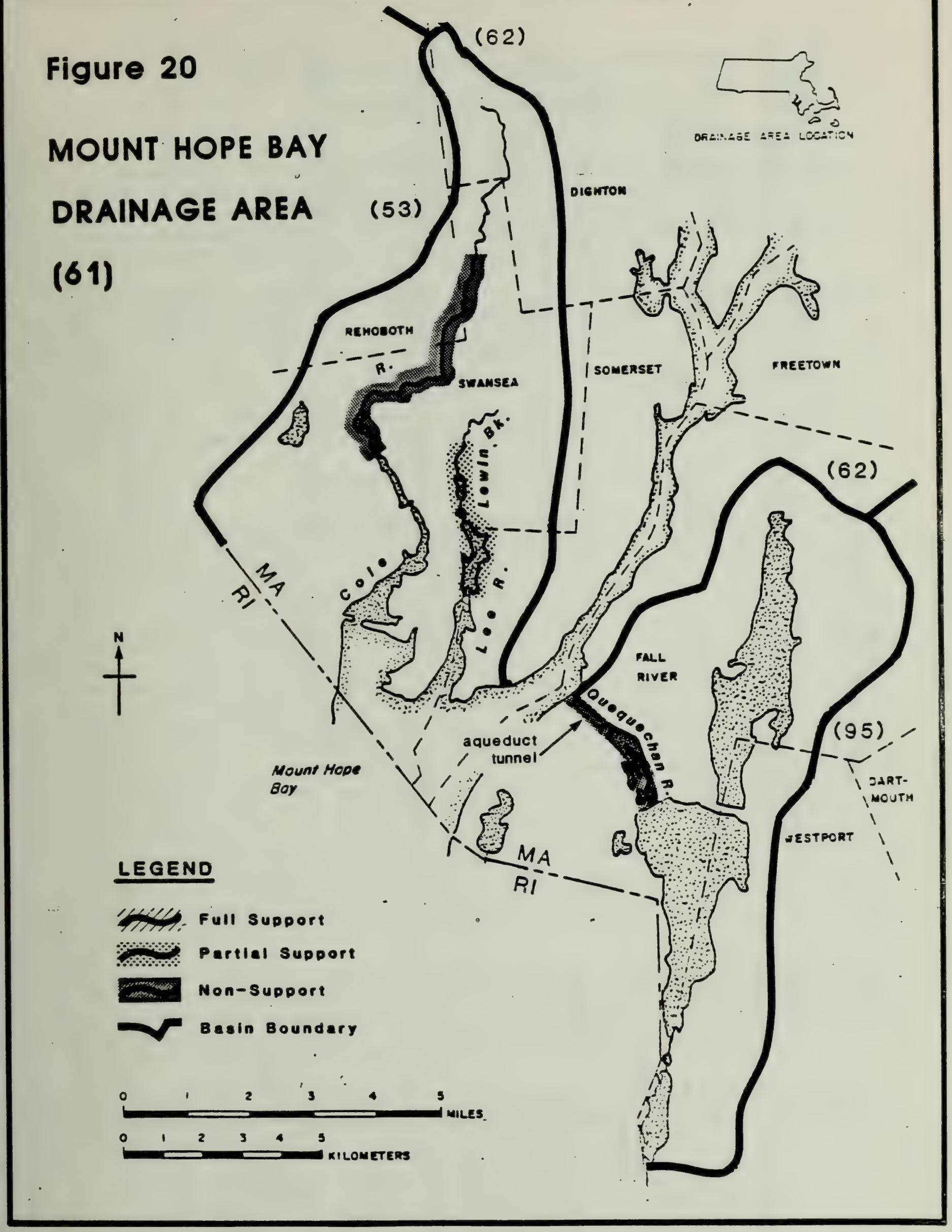


TABLE 18
MOUNT HOPE BAY DRAINAGE BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Lee River						
Lewin Brook from Gardner's Neck Rd., Swansea to Route 103 bridge on Wilbur Ave., Swansea	3.2-1.9	B/WWF/AD	PS	Fecal coliform bacteria Dissolved oxygen	-Failing septic systems	-Facilities plan to study problem.
Estuary, Route 6 Fall River Rd., Swansea/Somerset to Route 103 Wilbur Ave., Swansea/Somerset	1.9-1.4	SA	PS	Fecal coliform bacteria Dissolved oxygen	-Failing septic systems -Urban runoff -CSOs	-Facilities planning to study problems and eliminate CSOs.
Cole River						
Wood Street bridge to Fall River Road (Rt. 6), Swansea	5.0-3.6	B/WWF/AD	NS	Fecal coliform bacteria Dissolved oxygen	-Failing septic systems	-Same as above.
Estuary, from Fall Rd. (Rt. 6) to Wilbur Ave. bridge (Rt. 103) Swansea/Somerset	3.6-1.9	SA	NS	Fecal coliform bacteria	-Failing septic systems -CSOs	-Same as above.
Quequechan River						
Route 6 bridge, outlet to South Watuppa Pond, Fall River to Veaduct St. bridge, at Battleship Cove, Fall River	2.3-0.0	B/WWF	NS	Fecal coliform bacteria Dissolved oxygen	-CSOs	-Eliminate CSOs.

Miles Assessed: 7.2 mi
Miles Supporting Classification: 0 mi
Miles Partially Supporting Classification: 1.8 mi

MYSTIC RIVER BASIN AND COASTAL DRAINAGE AREA (71)

Description of the Watershed

The Mystic River Basin is located just north of the city of Boston and encompasses a drainage area of only 69 square miles. The basin, as depicted in Figure 21, is entirely urban in nature and is impacted by typical urban problems such as stormwater runoff, low stream flows and residual contaminant problems from pollutant discharges over the past several decades.

The headwaters of the Mystic include the two second order streams: the Aberjona River and Hall's Brook. Several small tributary streams flow into the Mystic River during its 17 mile course from the town of Reading to Boston Harbor. The middle portion of the river system is dominated by the Upper and Lower Mystic Lakes which act as hydraulic control and unfortunately, a pollutant trap. The lower portion of the river is separated by the Amelia Earhart dam, which was constructed in 1966 for flow control and to halt the salt water intrusion into the Mystic River as far upstream as the Lower Mystic Lake.

Water Quality Conditions and Trends

The Mystic River was sampled by the Division during 1986 from the confluence of Hall's Brook and the Aberjona River to the Amelia Earhart dam. The survey was a continuation of an ambient monitoring program which began in the early 1970's. The survey evaluated water column and sediment samples for oxygen-demands, solids, nutrients, metals, bacteria, and organic components at all locations. There are no significant point source discharges to the Mystic River, as all communities are connected to the Massachusetts Water Resources Authority (MWRA) sewerage system and wastewater is conveyed to the Deer Island Wastewater Treatment Plant where it receives a minimal degree of primary treatment and is discharged to Boston Harbor. The survey results indicated that the Mystic River and its upstream major tributaries remain in a polluted state; low dissolved oxygen, high fecal coliform bacteria and very high ammonia-nitrogen levels were found throughout much of the basin. The river receives combined sewer overflows from Alewife Brook which appear to discharge during dry as well as wet weather. In the upper portion of the basin, leachate from a chemical lagoon continues to discharge extremely high levels of ammonia to Hall's Brook. During the surveys, ammonia levels were as high as 16 mg/l at the upstream station. The metals analysis showed low values in both the water and sediment, with many of the water column samples at or below detection levels. Sediment levels for organic contaminants showed minimal levels of PCB's and PAH's. The levels were much lower than anticipated at the start of the survey.

In order for the Mystic River to approach meeting its designated standards and potential water uses, the combined sewer problems must be eliminated, the ammonia leachate must be stopped (the owner of the lagoon has an NPDES permit limiting ammonia, but the permit limit has not been met to date), and the destratification of Lower Mystic Lake must be successful.

The Mystic River does not meet its classification in any of its major stream segments. The river system needs significant abatement work and some residual control programs.

The Mystic River Basin is affected by typical urban nonpoint sources such as stormwater, in-place sediment, and accelerated eutrophication from excessive nutrient input. The basin was part of the nation-wide National Urban Runoff Program (NURP) in the late 1970's. The study identified the source and magnitude of runoff upon the integrity of the water quality of the Mystic River. The study is referenced in the accompanying list of Mystic River reports.

The delineation of the effect of nonpoint inputs upon the integrity of the Mystic River is difficult due to the severe impact of the chemical lagoon leachate (mentioned above) and the preponderance of combined sewer overflows to the river. The Upper and Lower Mystic Lakes are surely impacted by nonpoint sources, in particular nutrients, and in the case of the lower lake, by increased saline levels in the hypolimnion. A destratification project is underway at the lower lake which will hopefully eliminate the trapped anaerobic layer.

The control on nonpoint in the sub-basins of the Mystic River Basin can best be accomplished on a site specific basis. For example, Spy Pond, located in the town of Arlington, has a severe eutrophication problem due to stormwater induced nutrient loadings. A state sponsored program is addressing the problems and implementing a stormwater management program.

REFERENCES

Beauregard, D.G. 1975. The Mystic River: 1973 Water Quality Analysis. Massachusetts Division of Water Pollution Control. Westborough, Massachusetts. 65 pp.

Massachusetts Department of Environmental Quality Engineering, Office of Planning and Program Management. 1982. Upper Mystic Lake Watershed Urban Runoff Project Summary Report. Boston, Massachusetts. 56 pp.

Massachusetts Division of Water Pollution Control. 1974. The Mystic River 1973 Part A. Westborough, Massachusetts. 58 pp.

_____. 1981. The Mystic River 1978 Water Quality Data. Westborough, Massachusetts. 54 pp.

_____. 1982. The Mystic River Water Quality Data-1979, 1980, and 1981. Westborough, Massachusetts. 64 pp.

_____. Mystic River 1986 Water Quality Report. Westborough, Massachusetts. (in preparation).

Figure 21 MYSTIC RIVER BASIN and COASTAL DRAINAGE AREA (71)

TABLE 19
MYSTIC RIVER BASIN AND COASTAL DRAINAGE AREA

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Headwaters to inlet Mystic Lake, Lexington	18.4-15.1 15.1-8.8	B/WWF/AD B/WWF	NS	Low dissolved oxygen Fecal coliform bacteria Ammonia	-CSOs -Chemical lagoon leachate	-CSO control. -Chemical lagoon leachate elimination.
Inlet Upper Mystic to Amelia Earhart dam, Somerville	8.8-2.0	B/WWF	NS	Nutrients Fecal coliform bacteria	-Runoff -CSOs	-NPS control. -Eliminate CSOs.

Miles Assessed: 16.4 mi
Miles Supporting Classification: 0.0 mi
Miles Partially Supporting Classification: 0.0 mi

NASHUA RIVER BASIN (81)

Description of the Watershed

The Nashua River, located in north central Massachusetts and southern New Hampshire, consists of a north branch and a south branch which combine in Lancaster, Massachusetts to form the main stem. The river then flows in a northeasterly direction until it joins the Merrimack River in Nashua, New Hampshire. The river's 530 square mile drainage area lies primarily within Worcester and Middlesex counties in Massachusetts and includes the 115 square mile watershed of the Metropolitan District Commission's Wachusett Reservoir. However, only 12 million gallons of water per week are released to the south branch from this reservoir. As a result the Wachusett watershed has only minor importance with respect to the flow in the rest of the river basin.

From the headwaters of the north branch in Fitchburg to its confluence with the south branch, a distance of 19 miles, the river elevation drops 360 feet. The main stem then falls another 110 feet along its remaining 37 mile course to the Merrimack River. The United States Geological Survey maintains a single flow-gaging station on the main stem at East Pepperell. The flow at this station over the past forty years averaged 560 cubic feet-per-second (cfs). Gaging stations are located on the north branch of the Nashua River in Leominster and Fitchburg. The average flow at the Leominster gage over the same forty-year period was 193 cfs. The new gage at Fitchburg showed average yearly flows of from 96 to 141 cfs from 1975 to 1980.

Water Quality Conditions and Trends

During the 1960's and early 1970's the Nashua River was probably the most polluted stream in Massachusetts. In the early 1970's over 30,000 pounds per day of BOD were discharged to the Nashua River. Major sources included four paper manufacturing companies in Fitchburg; inadequately treated municipal waste from seriously overloaded treatment plants in Fitchburg, Leominster, Clinton, and Ayer; combined sewer overflows in Fitchburg and Leominster; non-point sources; and treated paper manufacturing waste discharges in Pepperell and West Groton.

In 1975 two new wastewater treatment plants were completed in Fitchburg. The Fitchburg Westerly plant was designed to process paper manufacturing waste and small loadings of domestic wastewater, thereby eliminating the direct discharge of untreated process waste to the north branch. The Fitchburg Easterly plant treated sanitary wastewater from the city. Both facilities were designed to provide better than secondary treatment. However, the westerly plant has exhibited many operational problems and it has not performed up to design expectations to date. The city's consultants requested a variance in water quality standards for two miles below the effluent discharge; the variance was denied. The city is currently operating under a consent order with the DEQE to construct the modification necessary to meet the current NPDES permit limits. The four paper companies which are the major contributors of influent to the westerly plant are uncertain that the costly modification incorporating a unique unproven process design would meet those limits. Therefore, the companies hired

a consultant to perform a waste assimilation capacity study of the North Nashua River assuming that the four non-functional dams below the westerly plant would be breached to eliminate impoundments during low flow conditions. Using the current stream model version used by the state and verified using 1985 Nashua River Survey data, the modeling concluded that a substantially higher BOD loading could be discharged if the four non-functional dams above the Daniel Street Bridge in Fitchburg were breached.

In 1977, BOD loadings to the Nashua River had been reduced to approximately 5,000-9,000 pounds-per-day. Water quality improvements have resulted from the construction of the Fitchburg treatment facilities. Since 1977, pollutant loadings have further been reduced by the completion of a new advanced wastewater treatment plant in Leominster in 1984, and a secondary treatment plant with phosphorus removal in Ayer in 1982. Sewer rehabilitation programs and the treatment plant upgradings have reduced BOD loadings an additional 3,000-8,000 pounds-per-day based on 1985 data.

Water quality problems still exist due to combined sewer overflows and dry weather sewage discharges in the city of Fitchburg. The city is under an administrative order to develop a plan for the removal of the CSOs.

The Clinton Wastewater Treatment Plant has an outdated collection system, inadequate capacity and severe inflow problems. During wet weather, bypass occurs to the south branch of the Nashua River. Consultants have prepared facility plans and designs for an upgraded facility with nitrification and phosphorus removal. The wastewater treatment plant presently contributes high concentrations of ammonia-nitrogen and phosphorus in the south branch. The ownership dispute between the Massachusetts Water Resources Authority (MWRA) and the Metropolitan District Commission was resolved by the assignment of ownership to the MWRA. Construction can now begin when the MWRA receives funding from the state's Construction Grants Program and selects a contractor.

Although the Nashua River Basin is dominated by point sources, nonpoint sources impact the Nashua River, Whitman River, Fall Brook, and James Brook. Agricultural runoff in Lancaster, Ayer, and Groton, and surface runoff from Fort Devens causes elevated coliform counts in the Nashua River and nutrient buildup in Pepperell Pond. Runoff from East Pepperell contributes to coliform and nutrients downstream from the pond. Untreated municipal discharges in Ashburnham cause coliform bacteria in the Whitman River. In Fall Brook and the Still River, coliform problems may be caused by surface runoff.

REFERENCES

Johnson, A.S. 1979. The Nashua River Basin Water Quality Analysis, 1977. Massachusetts Division of Water Pollution Control, Westborough, Massachusetts. 109 pp.

Massachusetts Division of Water Pollution Control. 1978. The Nashua River Basin 1977 Water Quality Survey Data. Westborough, Massachusetts. 144 pp.

_____. 1981. The Nashua River Basin Water Quality Management Plan. Westborough, Massachusetts. 82 pp.

_____. 1983. Nashua River Basin 1982 Water Quality and Wastewater Discharge Survey Data. Westborough, Massachusetts. 39 pp.

_____. 1983. Nashua River Basin 1980, 1981, and 1982 Wastewater Discharge Survey Data. Westborough, Massachusetts. 34 pp.

_____. 1983. Flag Brook Water Quality Survey Data 1980-1981. Westborough, Massachusetts. 27 pp.

_____. 1985. Nashua River Basin 1985 Water Quality and Wastewater Discharge Data. Westborough, Massachusetts. 44 pp.

Figure 22 NASHUA RIVER BASIN (81)

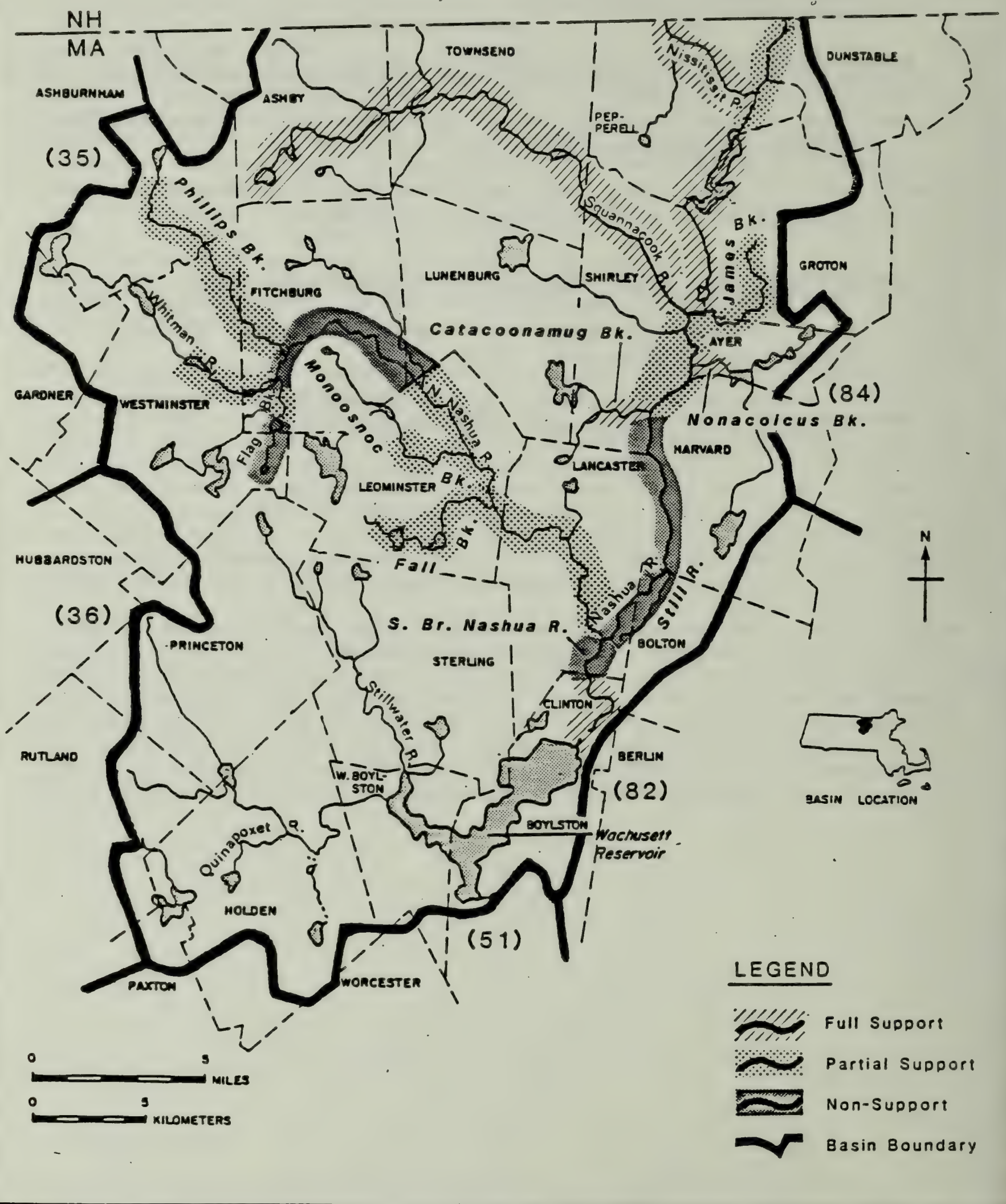


TABLE 20
NASHUA RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
North Nashua River						
Fitchburg Westerly WWTP to Fitchburg Paper Co. Mill #1 Dam	55.5-54.8	B/WWF	PS	Dissolved oxygen Suspended solids	-Fitchburg West WWTP	-Breach dams to increase reaeration.
Fitchburg Papaer Co. Mill #1 Dam to Fitchburg Easterly WWTP, Fitchburg	54.8-48.5	B/WWF	NS	Fecal coliform bacteria Suspended solids Nutrients	-CSOs -Storm drains	-Correct CSOs.
Fitchburg Easterly WWTP to Leominster WWTP, Leominster	48.5-46.4	B/WWF	NS	Fecal coliform bacteria Suspended solids	-CSOs -Surface runoff	-Correct CSOs.
Leominster WWTP to Lancaster town line	46.4-43.7	B/WWF	PS	Fecal coliform bacteria Suspended solids	-Surface runoff	--
Lancaster town line to confluence with south branch, Lancaster	43.7-36.5	B/WWF	PS	Fecal coliform bacteria Suspended solids	-Agricultural runoff	--
Nashua River						
Confluence of north and south branches to Harvard/ Shirley line	36.5-29.2	B/WWF	NS	Fecal coliform bacteria Dissolved oxygen Nutrients	-Surface runoff -Upstream discharges	-Upgrade Clinton WWTP.
Harvard/Shirley line to Ice House dam, Ayer	29.2-26.1	B/WWF	PS	Fecal coliform bacteria Dissolved oxygen	-Runoff from Fort Devens	--

TABLE 20 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Ice House Dam to confluence with Squannacook River, Shirley	26.1-23.0	B/WWF	PS	Fecal coliform bacteria Dissolved oxygen	-Surface runoff	-BMP
Confluence with Squannacook River to Pepperell Dam, Pepperell	23.0-14.2	B/WWF	S	--	--	--
Pepperell Dam to New Hampshire state line, Pepperell	14.2-10.5	B/WWF	PS	Fecal coliform bacteria Nutrients	-Surface runoff in Pepperell	--
<u>South Branch Nashua River</u>						
Above Clinton WWTP, Clinton	4.6-1.6	B/WWF	S	--	--	--
Clinton WWTP to confluence with the Nashua River, Lancaster	1.6-0.0	B/WWF	NS	Dissolved oxygen Ammonia Phosphorus	-Clinton WWTP	-Upgrade Clinton WWTP.
<u>Flag Brook</u> from outlet of Crocker Pond to confluence with the Whitman River, Fitchburg	2.7-0.0	B/SCWF	NS	Dissolved oxygen Suspended solids Nutrients Aesthetics	-Fitchburg landfill leachate	-Tie into Fitchburg West WWTP.

TABLE 20 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Whitman River	6.7-0.0	B/WWF/AD	PS	Fecal coliform bacteria	-Untreated municipal discharges in South Ashburnham	-Facility planning for collection and treatment of sewerage in area of critical water quality problems.
Phillips Brook	8.0-0.0	B/CWF/AD	PS	Fecal coliform bacteria	-CSOs in Fitchburg	-Facility planning for CSOs management.
Monoosnuc Brook, (downtown Leominster segment only)	1.5-0.0	B/WWF/AD	PS	Fecal coliform bacteria	-Surface runoff	--
Fall Brook	3.0-0.0	B/CWF/AD	PS	Fecal coliform bacteria	-Surface runoff	-Fall Brook Interceptor completed.
Still River	3.1-0.0	B/CWF/AD	PS	Fecal coliform bacteria Dissolved oxygen	-- -Natural sluggish flow	-Survey work needed to determine abatement.
Catacoonamug Brook	2.0-0.0	B/CWF/AD	S	--	--	--
Nonacoicus Brook	1.5-0.0	B/WWF/AD	S	Dissolved oxygen	-Natural conditions	--
Squannacook River	14.3-3.6	B/CWF/AD	S	--	--	--
	3.6-0.0	B/WWF	S	--	--	--
James Brook	4.4-0.0	B/WWF/AD	PS	Fecal coliform bacteria	-Septic system failures	-Proper subsurface disposal.
Nissitissit River	4.5-0.0	B/CWF	S	--	--	--

Miles Assessed: 101.3 mi
Miles Supporting Classification: 34.1 mi
Miles Partially Supporting Classification: 47.2 mi

NEPONSET RIVER BASIN AND COASTAL DRAINAGE AREA (73)

Description of the Watershed

The Neponset River Basin is located in eastern Massachusetts. The basin covers an area of 123 square miles and includes portions of the communities of Foxborough, Walpole, Sharon, Stoughton, Westwood, Norwood, Canton, Dedham, Milton, Quincy, and Boston. The Neponset River Basin is bounded by the Weymouth River Basin on the east, the Charles River Basin on the north and west, and the Taunton River Basin on the south. The river is 29.2 miles in length.

The headwaters of the river are the Neponset Reservoir, a 272 acre, man-made impoundment. The river travels in a northeast direction from Neponset Reservoir to its mouth in Boston Harbor. The river has several ponds and impoundments. Many of the impoundments were created by industries located in the basin. The slope of the river is mild, and the river is generally slow moving. The Neponset River becomes tidal in Milton, at the Walter Baker Dam.

Water Quality Conditions and Trends

The Technical Services Branch conducted water quality surveys of the Neponset River in 1986. Water quality was generally poor throughout the river. Dissolved oxygen levels were below 5.0 mg/l at some stations. Nutrients levels were high throughout the system, and all the river impoundments had high levels of algal and weed growth. Bacteria concentrations were high throughout the system. The fecal coliform standard was violated in 57 of 89 bacteria samples collected. The standard was violated at least once at each station.

There is only one major wastewater discharge to the Neponset River - the Foxboro Company, which discharges to Neponset Reservoir. There are three cooling water discharges and a small institution discharge from Foxborough State Hospital. The town of Foxborough is completing an agreement with the town of Mansfield (in the Taunton River Basin) to tie into the Mansfield sewer system. All the other towns provide wastewater treatment with on-site systems, or are sewered to the Massachusetts Water Resources Authority (MWRA) and ultimately discharge to Boston Harbor.

The Foxboro Company will tie into the Foxborough municipal sewer system by July 1, 1988. This will remove a significant source of phosphorus from the system. There are combined sewer discharges to the river from Milton and Boston, which cause major water quality problems. Water quality problems in the middle portion of the basin are caused by failing septic systems (in non-sewered areas), malfunctioning sewers (in sewered areas) and urban runoff. Extensive sewer system evaluation and repairs are needed in many of the communities in the watershed.

Water quality is generally poor in the Neponset River. Nonpoint sources of pollution are a significant problem in much of the basin. Nonpoint sources include malfunctioning sewer systems, urban runoff, failing subsurface systems, and inplace sediments.

REFERENCES

Metropolitan District Commission. 1982. Combined Sewer Overflow Project: Environmental Impact Report (preliminary). Boston, Massachusetts. 280 pp. + appendices.

Szczurko, S. 1976. Neponset River: 1973 Water Quality Analysis. Massachusetts Division of Water Pollution Control, Westborough, Massachusetts. 66 pp.

Massachusetts Division of Water Pollution Control. 1986. Neponset River Basin: Part A: Water Quality Data, Part B: Wastewater Discharge Data, Part C: Water Quality Analysis. Westborough, Massachusetts. 84 pp.

Figure 23 NEPONSET RIVER BASIN and COASTAL DRAINAGE AREA (73)

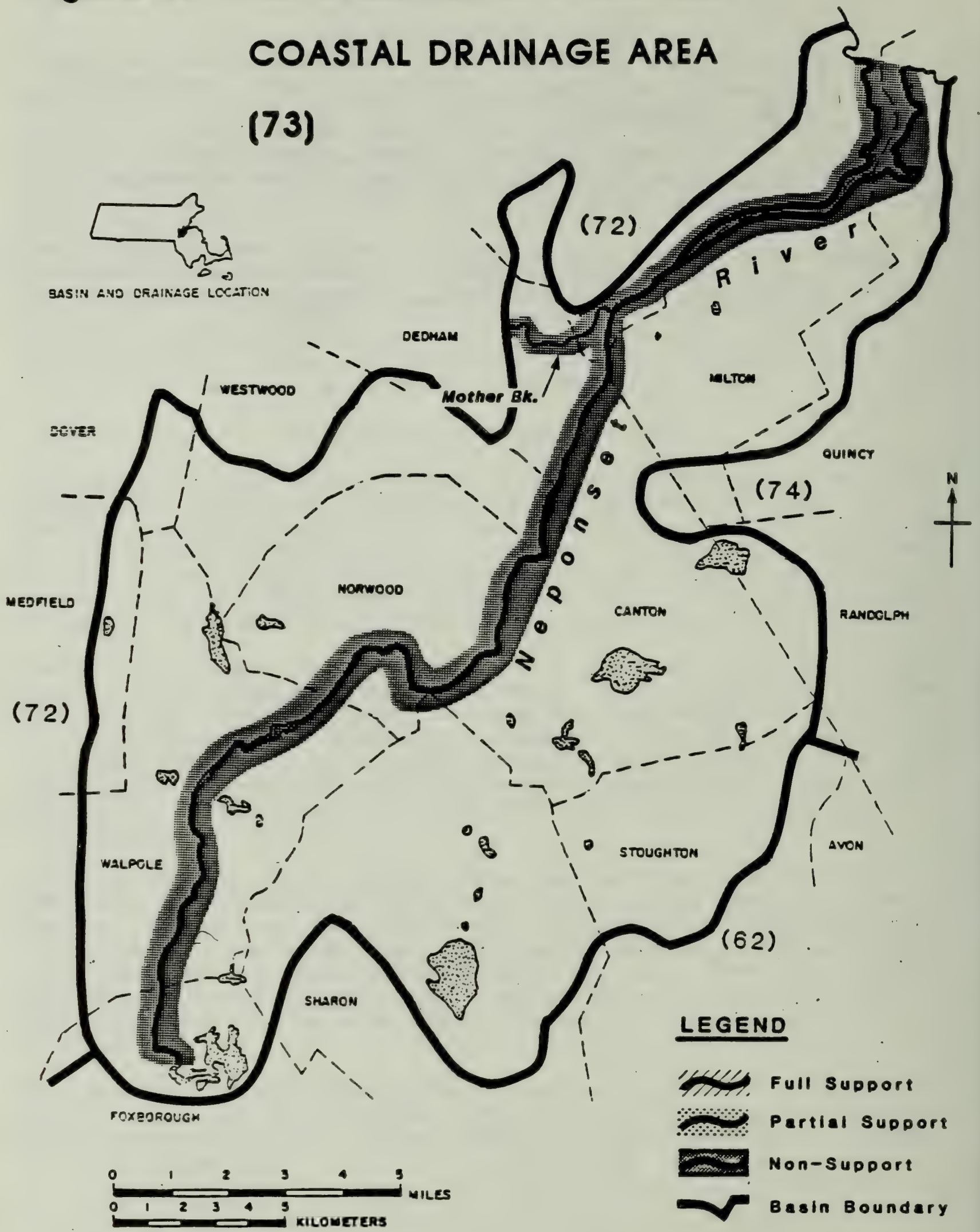


TABLE 21
NEPONSET RIVER BASIN AND COASTAL DRAINAGE AREA

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Neponset River						
Neponset River from Neponset Reservoir, Foxborough to confluence with East Branch, Canton	29.5-15.8	B/WWF	NS	Nutrients Fecal coliform bacteria	-Foxboro Co. discharge -Urban runoff -Failing septic systems	-Discharge will be eliminated. -Detailed study of area is needed.
The East Branch to confluence with Mother Brook, Boston	15.8-7.9	B/WWF	NS	Fecal coliform bacteria Nutrients Dissolved oxygen	-Urban runoff -Septic system and sewer system problems	-Detailed study of area is needed.
Mother Brook to Milton Lower Falls Dam, Milton-Boston	7.9-4.2	B/WWF	NS	Fecal coliform bacteria Nutrients Dissolved oxygne	-Combined sewer overflows	-Combined sewer elimination or treatment.
Milton Lower Falls Dam to Dorchester Bay, Boston-Quincy	4.2-0.0	SB	NS	Dissolved oxygen Fecal coliform bacteria, Nutrients	-Combined sewer overflows	-Combined sewer elimination or treatment.
Mother Brook						
Mother Brook Dam, Dedham to confluence with Neponset River, Boston	3.1-0.0	B/WWF	NS	Fecal coliform bacteria Nutrients	-Urban runoff -Sewer system problems	-Detailed study of area is needed.

Miles Assessed: 32.6 mi
Miles Supporting Classification: 0.0 mi
Miles Partially Supporting Classification: 0.0 mi

NORTH SHORE COASTAL DRAINAGE AREA (93)

Description of the Watershed

The North Shore Coastal drainage area extends from the Essex River to Boston Harbor. The sixteen cities and towns in the area range from highly urbanized Lynn, Salem and Beverly to rural Manchester and Essex. The total drainage area is 137.9 square miles; 43.0 miles of rivers have been assessed and 27.44 square miles of bays, and harbors have been assessed.

The major rivers are the Essex River in Essex, Annisquam River in Gloucester, Danvers River in Danvers and the Saugus and Pines Rivers in Saugus. Many smaller rivers and brooks from the inland rural areas feed into these larger rivers. Important harbors and bays are located in Essex, Rockport, Gloucester, Manchester, Beverly, Salem, Marblehead, Nahant and Lynn.

The harbors and bays support recreational, commercial, and industrial activities including fishing, boating, swimming and power generation. Freshwater resources are limited. Most of the inland rivers and brooks are too small for any kind of recreation. Groundwater resources are also relatively limited because of the nearness of crystalline igneous and metamorphic bedrock to the surface. The bedrock, which outcrops extensively along the shore, is a dominant physical aspect of this coastal area.

Water Quality Conditions and Trends

The north shore coastal area is well known for its fishing, lobstering and shellfishing industries. Starting in 1629 the Cape Ann and Salem Sound areas were catching and selling fish and setting up fishing stations and houses. Whaling also started in the mid 1600's, as Salem and Gloucester set up ports even before Nantucket. Shellfishing was also highly productive commercially.

During the 1700's the Salem-Beverly-Lynn area became industrialized. Tanneries and factories sprang up all along the rivers and tributaries leading to the bays and harbors, with raw sewage and untreated wastes discharged to the rivers. Consequently, the rivers and harbors became grossly polluted. In 1925, at the request of the Department of Public Health, the Division of Fisheries and Wildlife prohibited the taking of shellfish from areas in Danvers, Beverly, Salem, Manchester and Marblehead. Presently 45 percent of the shellfish flats north of Boston (including Ipswich, Parker and Merrimack Rivers) are closed to shellfish. Fifteen percent of the shellfish areas are restricted and require depuration treatment. The remaining 40 percent of the shellfish flats are open. Depuration plants pass clean water over the mildly contaminated shellfish, allowing then to naturally cleanse themselves.

Until recently, none of the 16 towns and cities within the basin treated their sewage. Beginning in the mid-1970's, wastewater treatment plants were constructed in the towns of Essex, Gloucester, Rockport, Manchester-Magnolia, Marblehead, Swampscott, Lynn and the South Essex Sewerage District (SESD) (serving Salem, Peabody, Danvers and Beverly).

Under the 1977 amendments to the Clean Water Act, section 301(h) allowed existing marine dischargers an opportunity to investigate the environmental impact of primary effluent discharges and to apply for a waiver of secondary treatment requirements. Each of these wastewater dischargers conducted extensive water quality, biological and oceanographic sampling to be used in modeling programs that defined existing conditions and predicted future impacts. Calculations were made on the fate of pollutants, solids distribution and anticipated biological changes in receiving waters. All of these waivers, except Gloucester, have been rejected. Gloucester's request to retain primary treatment but extend the outfall out of the harbor was accepted. Design of this extension is underway. Lynn, SESD and Swampscott conducted more studies and resubmitted their 301(h) waiver applications. Their requests were again rejected but are currently under appeal by the communities.

Water quality monitoring has been conducted by the Division over the past decade. In 1976 a comprehensive survey was conducted on the entire north coastal inland and ocean waters. Extensive surveys were also conducted on Gloucester Harbor (1982) and Salem Sound, Salem and Beverly Harbors and tributaries (1983, 1985, 1987).

The most recent surveys (1987) identified pollution problems which included high coliform bacteria in the harbors, primarily from CSO's (Gloucester) and treatment plant outfalls (SESD). Several tributaries, notably the South and North Rivers in Salem had consistently high fecal coliform bacteria counts, indicating a possible illegal sewage tie-in. Sediment grabs in the inner harbor of Gloucester showed evidence of PCB's, PAH's and heavy metal contamination. High levels of oil and grease were noted at stations near the fish processing plants in the inner harbor.

Sediment grabs in the North River showed extremely high concentrations of some heavy metals, particularly, chromium, lead, and mercury. Detectable levels of PCB's and PAH's were also found in the sediments in this river.

REFERENCES

Massachusetts Division of Water Pollution Control. 1977. North Coastal: 1976 Part A - Water Quality Data; Part B - Wastewater Discharge Data. Westborough, Massachusetts. 53 pp.

_____. 1976. North Coastal Water Quality Management Plan, 1975. Westborough, Massachusetts. 86 pp.

_____. 1982. Gloucester Harbor Water Quality Data 1980 & 1982. Westborough, Massachusetts. 43 pp.

_____. 1982. The Saugus River Basin, 1982 Water Quality Data. Westborough, Massachusetts. 16 pp.

_____. 1983. Salem Sound 1983 Water Quality Survey. Westborough, Massachusetts. 38 pp.

_____. 1985. Salem-Beverly Harbor Tributaries, 1985 Water Quality Survey. Westborough, Massachusetts. 35 pp.

_____. 1988. North Coastal 1987 Water Quality Survey Data Part A. Westborough, Massachusetts. (in preparation).

Massachusetts Division of Marine Fisheries 1985. Assessment at Mid Decade. 31 pp.

Figure 24 NORTH COASTAL DRAINAGE BASIN (93)

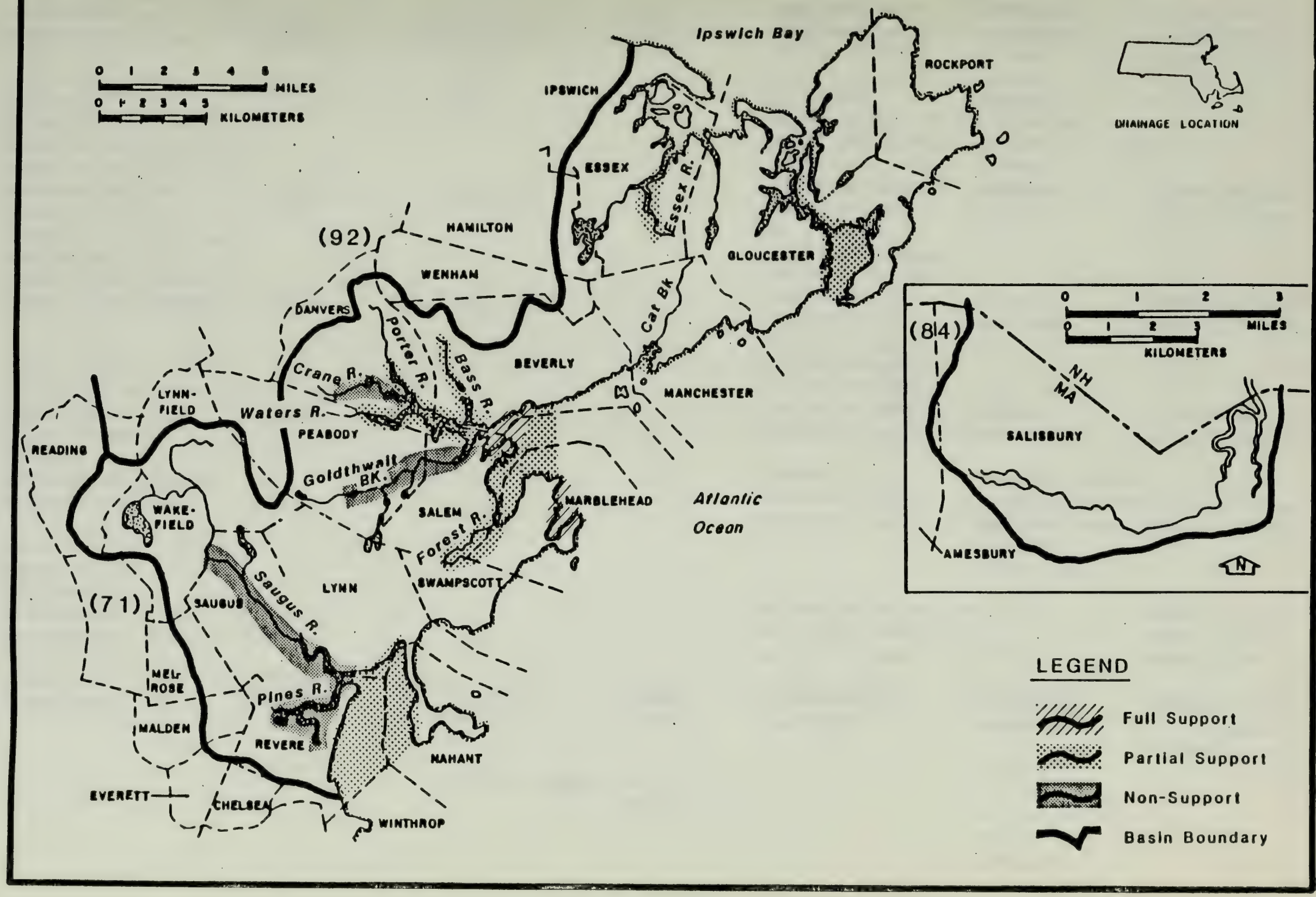


TABLE 22
NORTH SHORE COASTAL DRAINAGE AREA

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Waters River from headwaters to confluence with Danvers River, Danvers	2.0-0.0	SB	PS	Fecal coliform bacteria, Heavy metals in sediments	-Unknown	-Needs investigation.
Headwaters Crane Brook to Mill Pond, Danvers	3.9-1.6	B/WWF/AD	NS	Fecal coliform bacteria Metals	-Unknown -Landfill upstream	-Needs further investigation.
Crane River from Mill Pond to Danvers River, Danvers	1.6-0.0	SB	NS	Fecal coliform bacteria, Heavy metals and PAH's in sediments	-Unknown	-Needs further investigation.
Porter River from Frost Fish Brook to confluence with Danvers River, Danvers	1.5-0.0	SB	PS	Fecal coliform bacteria, Heavy metals and PAH's in sediments	-Unknown	-Needs investigation.
Goldthwait Brook from Cedar Pond to North River, Peabody	3.3-0.0	B/WWF/AD	NS	Fecal coliform bacteria, Metals Nutrients, Low D.O., PAH's and heavy metals in sediments	-Landfill -Industrial complex -Former tanneries -Sediment	-Needs further investigation.
North River from confluence of Goldthwait Brook and Proctor Brook to confluence with Danvers River, Salem	2.7-0.0	SB	NS	Fecal coliform bacteria, Metals Oil and grease Low D.O. Nutrients, PAH's, PCB's and heavy metals in sediments	-Former tanneries -Sediment -Unknown	-Needs further investigation.

TABLE 22 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Bass River, from headwaters to confluence with Danvers River, Beverly	3.7-1.3 1.3-0.0	B/WWF/AD SB	PS	Fecal coliform bacteria PAH's and heavy metals in sediment	-Sediment -Unknown	-Needs investigation
Danvers River from source to mouth	1.9-0.0	SB	PS	Fecal coliform bacteria PAH's and heavy metals in sediment	-Sediment -Unknown	--
Forest River, Salem	0.5-0.0	SB	PS	Fecal coliform bacteria PAH's and heavy metals in sediment	-Unknown -Sediment	-Needs investigation.
Essex River from source to mouth	4.9-0.0	SA	PS	Fecal coliform bacteria	-Unknown	--
Annisquam River from source to mouth	3.6-0.0	SA	NS	Fecal coliform bacteria, Shellfishing restricted	-Domestic sewage -Vessel discharges -Combined sewage overflows -Urban runoff	
Saugus River from source to mouth	8.6-4.3 4.3-0.0	B SB	NS	Fecal coliform bacteria, Dissolved oxygen, Metals	-Unknown	-Needs further investigation.
Pines River from source to mouth	6.4-0.0	SB	NS	Fecal coliform bacteria	-Unknown	
Essex Bay	1.15 mi^2	SA	U	--	-Essex River tributary to bay has known coliform problems	--

TABLE 22 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Rockport Harbor	0.019 mi^2	SB	U	--	-Rockport secondary wastewater treatment plant discharges to bay	--
Gloucester Harbor	2.24 mi^2	SB	PS	Fecal coliform bacteria Low D.O. PCB'S and PAH's in sediment	-CSOs -Vessel discharges -Urban runoff	-New WWTP recently completed construction, outfall and diffuser to be extended.
Manchester Harbor	0.29 mi^2	SB	PS	Fecal coliform bacteria	-Vessel discharges -Polluted tributary water	-Stop tributary contamination.
Beverly Harbor	0.78 mi^2	SB	S	Some heavy metals in sediment	-SESD	-Upgrade SESD extend outfall.
Salem Harbor	1.62 mi^2	SB	PS	Fecal coliform bacteria PAH's and heavy metals in sediment	-SESD -Sediments -Vessel discharges -Polluted tributary	-Upgrade SESD extend outfall. -Stop tributary contamination.
Marblehead Harbor	0.56 mi^2	SA	S	Heavy metals found in sediments	-Possible problem from vessel discharge -Sediment contamination from SESD -Marinas	-Upgrade SESD -Extend outfall.

TABLE 22 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Lynn Harbor	6.67 mi^2	SB	PS	Fecal coliform bacteria	-CSOs -Lynn raw discharge -Urban runoff	-Upgrade Lynn treatment plant and extend diffuser outfall.
Nahant Bay	5.27 mi^2	SA	PS	Fecal coliform bacteria	-CSOs -Lynn raw discharge	-Upgrade Lynn treatment plant and extend diffuser outfall.
Salem Sound	10.01 mi^2	SB	PS	Fecal coliform bacteria, Heavy metals, Nutrients	-SESD not operating well	-Upgrade SESD to secondary treatment and extend ocean diffuser.

Miles Assessed: 43.0 mi
Miles Supporting Classification: 0.0 mi
Miles Partially Supporting Classification: 20.4 mi

Square Miles Assessed: 27.44 mi^2
Square Miles Supporting Classification: 1.34 mi^2
Square Miles Partially Supporting Classification: 26.10 mi^2

PARKER RIVER BASIN AND COASTAL DRAINAGE AREA (91)

Description of the Watershed

The Parker River Basin lies between the drainage basins of the Ipswich and Merrimack Rivers in northeastern Massachusetts. All or part of nine communities lie within the 60 square mile area drained by the Parker River. The basin is generally rural - residential in nature, with only minor industrial development. The estuarine portion of the Parker River is a magnificent natural resource and is protected under the Wild and Scenic Rivers Act.

The Parker River rises at the confluence of two unnamed brooks in a wetland area in West Boxford. The river flows generally in a northeasterly direction through several small ponds and extensive wetland areas in the towns of Boxford, Groveland, and Newbury. In Newbury, and for the nine miles to the coast, the river is tidal. The Parker River flows through extensive coastal wetlands to its mouth where it empties into Plum Island Sound.

The Parker River is 23 miles long, drains 60 square miles, and has an average discharge into Plum Island Sound of 97.2 cfs. From its source to its mouth the Parker River falls a total of 95 feet, of which 36 feet are taken up by the six dams on the river.

The major topographic features of the Parker River Basin are low, rounded hills, freshwater wetlands, saltwater marshes and several lakes and ponds which have formed in depressions in wetland areas.

Water Quality Conditions and Trends

The freshwater portion of the Parker River flows through extensive wetland areas and is impounded in two locations by man-made dams. The wetland conditions, accompanied with low stream flow, produce naturally occurring low dissolved oxygen levels.

Nonpoint sources provide the only other pollutant flows to the Parker River. As the river flows through several rural towns, it is subject to runoff and septic tank leachate. Neither of these water quality impacts are considered serious; hence, the river meets its assigned classification.

Analysis of the estuarine portion of the river has shown moderate dissolved oxygen and bacterial standards violations. It is projected that the causes are natural, probably the saltwater marsh influence and thus, this portion is listed as meeting its classification.

REFERENCES

Johnson, Arthur S. A Water Quality and Deepwater Habitat Assessment of the Parker River Basin - Results of the 1984 Survey. Massachusetts Division of Water Pollution Control. Westborough, Massachusetts. 13 pp. (with appendices).

Massachusetts Division of Water Pollution Control. 1977. The Ipswich and Parker Rivers 1976 Part D - Water Quality Management Plan. Westborough, Massachusetts. 196 pp (with appendices).

_____. 1979. Ipswich and Parker River Basins 1978 Water Quality Survey Data. Westborough, Massachusetts. 93 pp.

Figure 25 PARKER RIVER BASIN (91)

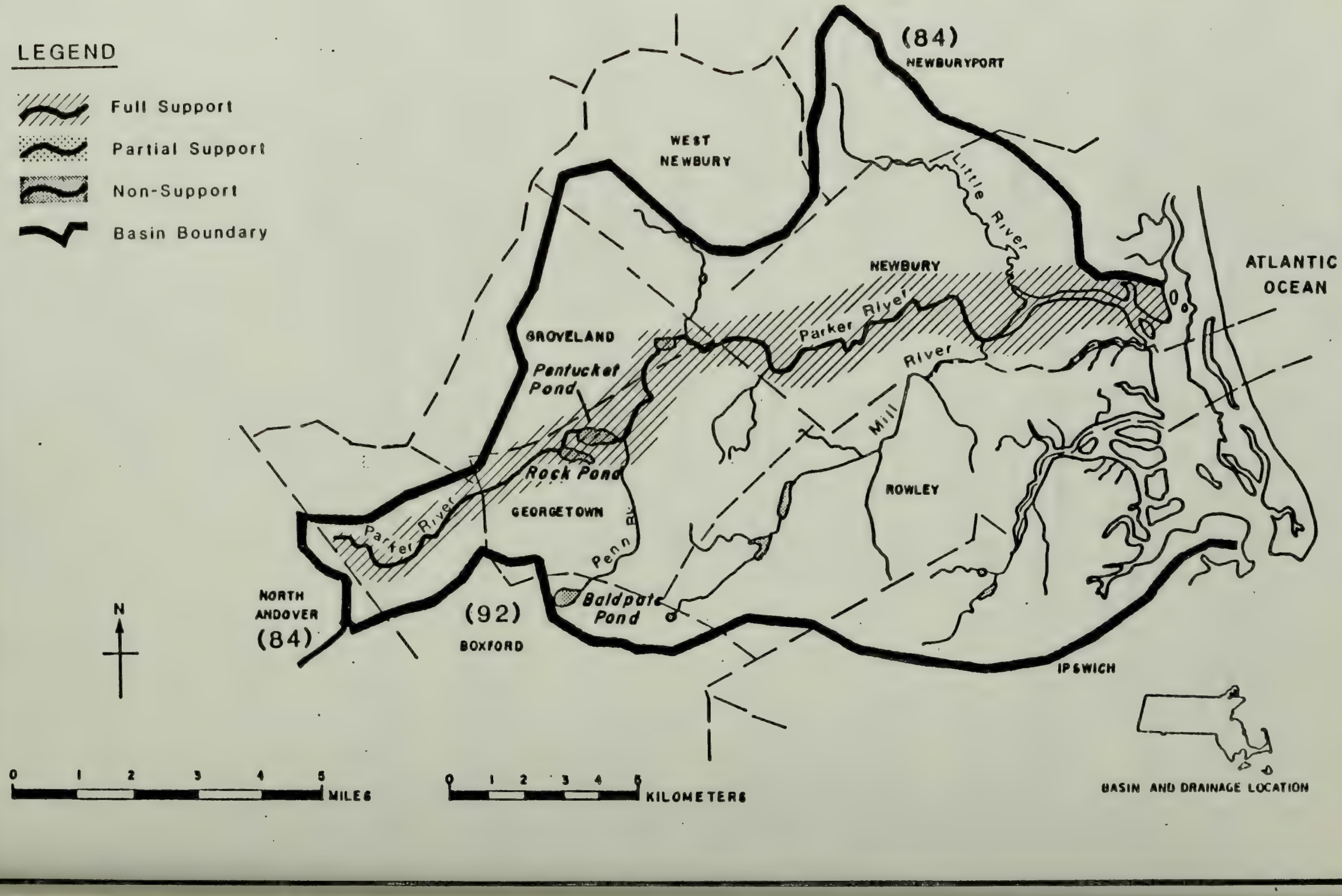


TABLE 23
PARKER RIVER BASIN AND COASTAL DRAINAGE AREA

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Parker River						
Its source in Boxford to Central Street, Newbury	22.0-9.0	B/WWF/AD	S	Dissolved oxygen	-Natural conditions	--
Central Street, Newbury to its mouth at Plum Island Sound, Newbury	9.0-0.0	SA/AD	S	Dissolved oxygen Fecal coliform bacteria	-Natural conditions	--

Miles Assessed: 22.0 mi
Miles Supporting Classification: 22.0 mi
Miles Partially Supporting Classification: 0 mi

QUINEBAUG RIVER BASIN (41)

Description of the Watershed

The Quinebaug River Basin covers 744 square miles in south central Massachusetts, eastern Connecticut, and northwestern Rhode Island. The Quinebaug River flows 76 miles from its source in Mashpaug Pond in Union, Connecticut to its confluence with the Shetucket River in Norwich, Connecticut. Of the Quinebaug's 76 miles, 28 lie in Massachusetts and drain an area of 148 square miles. Major tributaries are Cady Brook in Massachusetts and the French, Five Mile, Moosup, and Pachaug Rivers in Connecticut. Of these, the French is the largest, extending 26 miles from its source in Greenville Pond, Leicester, Massachusetts to the confluence with the Quinebaug River in Thompson, Connecticut.

From its source in Mashpaug Pond, the Quinebaug River flows a short distance northwest to Hamilton Reservoir, which lies on the Connecticut-Massachusetts state line. Leaving this reservoir in Holland, Massachusetts, the river flows north to Sturbridge, where it passes through Old Sturbridge Village. Upon leaving Sturbridge, the river turns southeast to Southbridge where it is joined by Cady Brook, Dresser Hill Brook, and Lebanon Brook, and on through Dudley to recross the state line. After the French River enters Thompson, Connecticut, the Quinebaug flows generally south through Putnam, Danielson, and Plainfield to its confluence with the Shetucket River in Norwich. This confluence forms the Thames River, which continues south to Long Island Sound.

The Sturbridge and Southbridge Sewage Treatment Plants along with the American Optical Corporation discharge their effluents to the Quinebaug River in Massachusetts. Additional wastes are discharged to Cady Brook in Charlton, Massachusetts by the town's sewage treatment plant, and several small domestic waste overflows.

Three major flood control dams were constructed on the Quinebaug River by the U.S. Army Corps of Engineers following extensive flooding in 1955. These are the East Brimfield and Westville Dams in Massachusetts and the West Thompson Dam in Connecticut. The U.S. Geological Survey maintains three flow gaging stations on the Quinebaug River, two of which are located just downstream from the East Brimfield and Westville Dams. The East Brimfield gage drains an area of 67.5 square miles and has an average discharge of 139 cubic feet-per-second for a recording period of 1972 to 1984, while the Westville gage has an average flow of 146 cubic feet-per-second for the period of record from 1963 to 1984 and has a drainage area of 99.1 square miles. The third U.S.G.S. gage is located in Quinebaug, Connecticut. It drains an area of 156 square miles and has an average discharge of 275 cubic feet-per-second from 1931 to 1984.

Water Quality Conditions and Trends

In the early 1800's factories and mills sprang up in areas adjacent to the Quinebaug River in Sturbridge, Southbridge, and Dudley and on Cady Brook in Charlton. These factories subjected the river to high oxygen demand and nutrient loadings. Today these towns remain industrialized, but with treated effluents discharging to the river.

Construction of wastewater facilities in the towns of Sturbridge, Southbridge and Charlton helped eliminate the direct discharges of untreated sewage and industrial wastes to the river. Since the initial construction, the Sturbridge plant has been expanded, the Southbridge plant has been upgraded, and facility planning for upgrading the Charlton City plant is underway. Further water quality improvements have occurred as a consequence of American Optical treating their wastes prior to discharge and two major companies going out of business. The quality of the river is improving, and class B water quality standards are being met.

The major nonpoint source contamination in the Quinebaug River is from urban runoff as the river flows through Sturbridge and Southbridge and from in-place sediments in the West Dudley Impoundment below the Southbridge WWTP.

REFERENCES

Central Massachusetts Regional Planning Commission. 1980. Areawide Water Quality Management Plan. Worcester, Massachusetts.

Massachusetts Division of Water Pollution Control. 1975. French and Quinebaug River Basin Water Quality Management Plan. Westborough, Massachusetts. 84 pp.

_____. 1977. French and Quinebaug Rivers 1976 Water Quality Survey Data. Westborough, Massachusetts. 127 pp.

_____. 1980. The Quinebaug River 1980 Water Quality Survey Data. Westborough, Massachusetts. 63 pp.

_____. 1982. The French and Quinebaug River Basin, 1981 Water Quality Management Plan. Westborough, Massachusetts. 96 pp.

_____. 1982. French and Quinebaug River Basins Water Quality and Wastewater Discharge Survey Data. Westborough, Massachusetts. 61 pp.

_____. 1985. The French and Quinebaug Rivers 1984 and 1985 Water Quality and Wastewater Discharge Survey Data. Westborough, Massachusetts. 94 pp.

Smith, Jeffrey B. 1978. French and Quinebaug Rivers 1974 & 1976 Water Quality Analysis. Massachusetts Division of Water Pollution Control, Westborough, Massachusetts. 94 pp.

Figure 26

QUINEBAUG RIVER BASIN

(41) (excluding DOUGLAS)

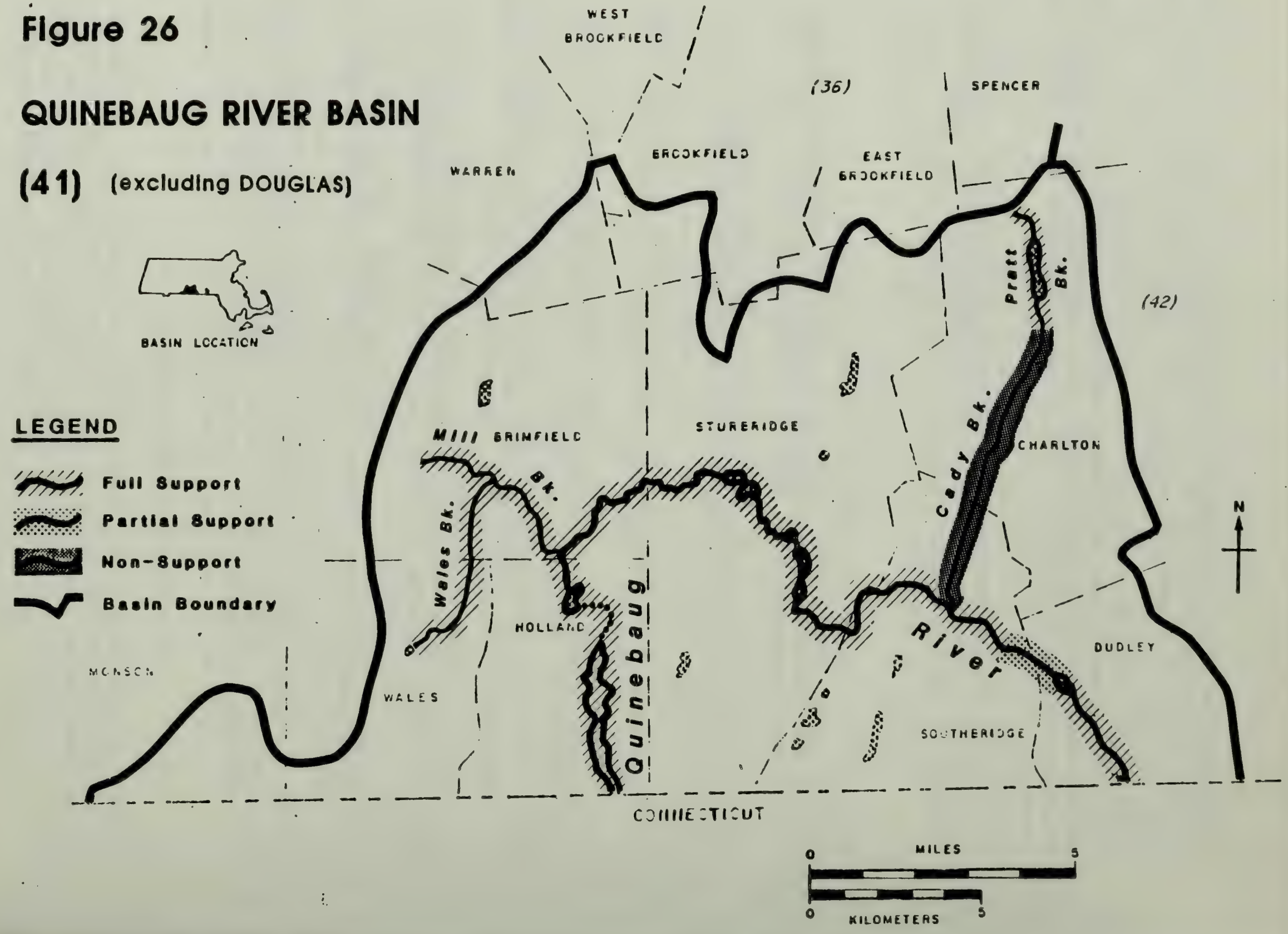


TABLE 24
QUINEBAUG RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Quinebaug River						
Above Sturbridge WWTP, Sturbridge	30.7-19.1	B/CWF/AD	S	--	--	I/I control at Sturbridge WWTP
Quinebaug River from Sturbridge WWTP to Southbridge WWTP	19.1-12.2	B/CWF	S	Fecal coliform bacteria, Solids Phosphorus	-Sturbridge WWTP in wet weather	--
Southbridge WWTP to West Dudley Impoundment, Dudley	12.2-10.2	B/WWF	PS	Fecal coliform bacteria Nutrients and oxygen demand from sediments	-Urban runoff -Sediments	-Further study needed.
West Dudley Impoundment to MA-CT state line	10.2-7.9	B/WWF	S	--	--	--
Cady Brook source to Charlton City STP	6.1-5.1	B/WWF/AD	S	--	--	--
Charlton City STP to confluence with Quinebaug	5.1-0.0	B/WWF	NS	Fecal coliform bacteria, Dissolved oxygen Solids, Phosphorus	-Charlton City WWTP.	-Upgrade Charlton City WWTP. -Evaluate sewer needs.
Mill Brook	4.3-0.0	B/CWF/AD	S	--	--	--
Wales Brook	4.9-0.0	B/CWF/AD	S	--	--	--

Miles Assessed: 38.1 mi
Miles Supporting Classification: 31.0 mi
Miles Partially Supporting Classification: 2.0 mi

SHAWSHEEN RIVER BASIN (83)

Description of the Watershed

The Shawsheen River originates near Hanscom Air Force Base in Bedford and flows generally northeast through Billerica, Tewksbury, and Andover where it enters the Merrimack River in south Lawrence. In its 25 mile length, the Shawsheen drains an area of approximately 77 square miles and falls 70 feet. Dams create two impoundments along its entire length. The main stem is fed by numerous small brooks and streams along its path to the Merrimack River. For nearly half its length, the Shawsheen meanders through marshy wetland areas.

Water Quality Conditions and Trends

The Shawsheen River Basin, like much of eastern Massachusetts during the mid 1980's, is experiencing considerable development pressure. The river generally meets class B standards for water quality. Much of this stream flows sluggishly through wetlands and freshwater marshes which are highly productive. Natural dissolved oxygen depletion and increased nutrient content are associated with these wetland areas. Elevated nutrient levels contribute to increased phytoplankton counts and subsequent diurnal dissolved oxygen fluctuations. Coliform bacteria counts are high in Andover and South Lawrence due to small wastewater discharges and urban runoff. The Shawsheen River and its major tributaries were last sampled in 1982.

REFERENCES

Massachusetts Division of Water Pollution Control. 1975. Shawsheen River 1974 Water Quality Survey Data. Westborough, Massachusetts. 59 pp.

_____. 1977. 1974 Baseline Water Quality Studies of Selected Ponds in the Stony Brook and Shawsheen River Basins. Westborough, Massachusetts. 73 pp.

_____. 1980. The Merrimack River Basin 1979 Water Quality Survey Data, Wastewater Discharge Data, Non-point Source Sampling Data. Westborough, Massachusetts. 125 pp.

Screpetis, A.J. 1975. The Shawsheen River Water Quality Analysis and Basin Plan. Massachusetts Division of Water Pollution Control. Westborough, Massachusetts. 89 pp (with appendices).

Johnson, A. 1983. Memorandum for the Record, Re: 1982 Shawsheen River Basin Survey. Westborough, Massachusetts.

Figure 27 SHAWSHEEN RIVER BASIN (83)

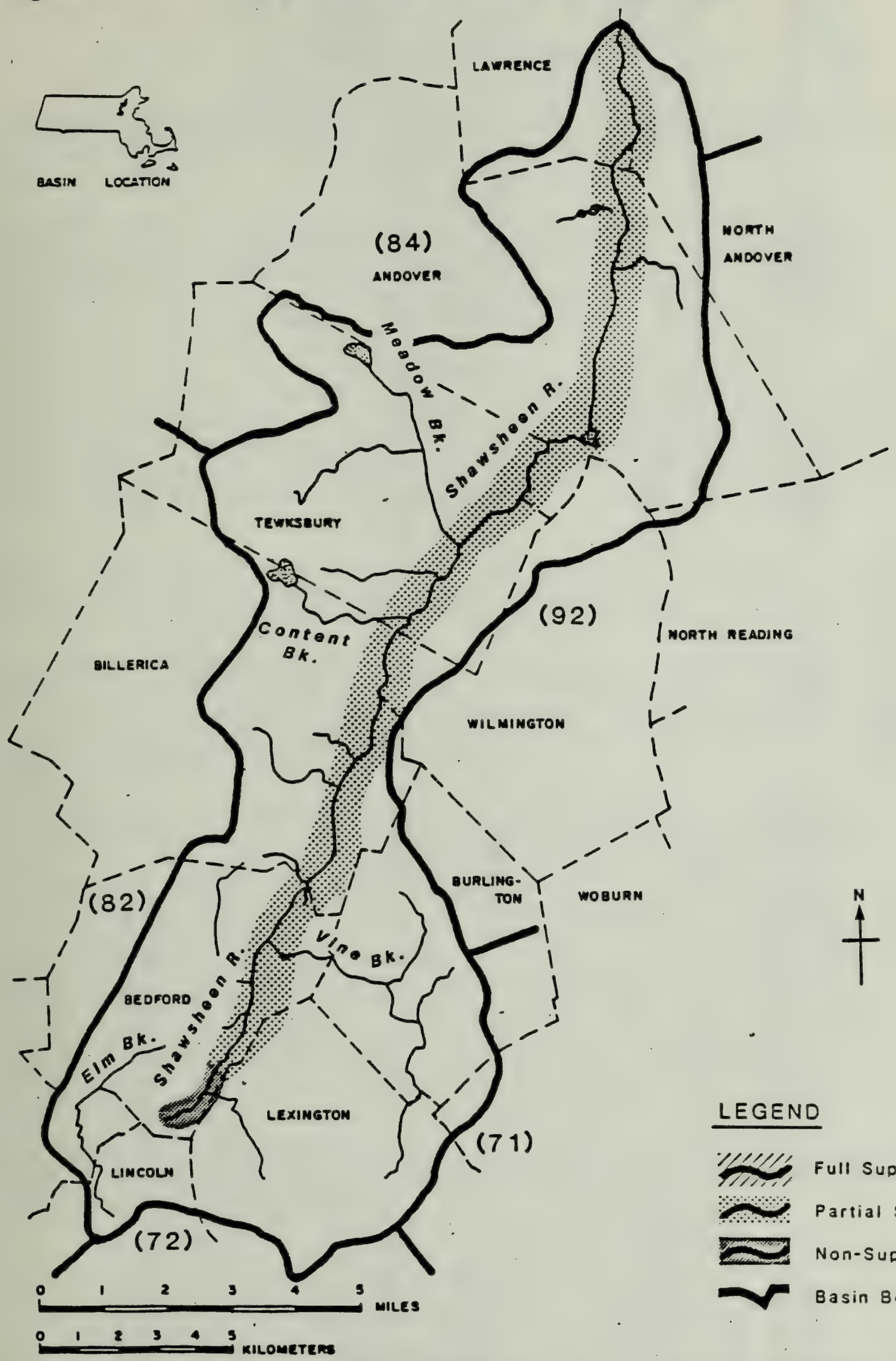


TABLE 25
SHAWSHEEN RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Shawsheen River						
Shawsheen River from Maguire Road to Spring Brook, Bedford	25.0-23.3	B/SCWF	NS	Dissolved oxygen Fecal coliform bacteria	-Surface runoff	-Initiate storm-water management practices in the town of Bedford as recommended in the MAPC 208 report.
Spring Brook to Horn Bridge, Andover	23.3-5.9	B/SCWF	PS	Fecal coliform bacteria Dissolved oxygen	-Surface runoff -Natural conditions	-Best management practices (BMP).
Horn Bridge to confluence with Merrimack River, Lawrence	5.9-0.0	B/SCWF	PS	Fecal coliform bacteria	-Surface runoff	-Initiate storm-water management techniques in Andover and Lawrence as outlined in MVPC 208 report.

Miles Assessed: 25.0 mi
Miles Supporting Classification: 0.0 mi
Miles Partially Supporting Classification: 23.3 mi

SOUTH SHORE COASTAL DRAINAGE AREA (94)

Description of the Watershed

The South Shore drainage area is located southeast of the Metropolitan Boston area and includes two major river basins, the North River and Jones River Basins.

The North River is essentially two rivers. The portion above Curtis Crossing Dam in Hanover is a freshwater stream which originates near the Weymouth Naval Air Station at the French Stream. The French Stream flows through Abington, Rockland and into Hanover whereupon the Drinkwater River flows into the mainstem and the river becomes the Drinkwater River. When Indian Head Brook flows into the mainstem river in Hanson, the river again changes its name to the Indian Head River. The Indian Head River is impounded by the Curtis Crossing Dam in Hanover. Below Curtis Crossing, the North River becomes saline and subject to tidal influence. The river flows through Pembroke, Norwell, Scituate and Marshfield discharging to Massachusetts Bay. Approximately nine river miles are freshwater and 11.5 river miles are subject to tidal effects. The river flows through and receives drainage from natural wetlands and marshes along much of its length.

Major tributaries are the South River which enters in Marshfield, Third Herring Brook which enters at the Norwell-Hanover town line, First Herring Brook which enters in Scituate, and the Upper Drinkwater River which enters in Hanover.

The North River Basin drains a total area of 105.4 square miles. The United States Geological Survey (U.S.G.S) operates a gaging station at Curtis Crossing which drains 50.3 square miles. Over the last 17 years, the gage has recorded an average flow of 62.4 cubic feet per second (cfs) with maximum and minimum flows of 1,390 cfs and 0.14 cfs, respectively.

The Jones River originates at the outlet of Silver Lake in Kingston and flows in an east-southeasterly direction for approximately seven miles to Plymouth Bay. The Jones River Basin drains a total area of 22 square miles excluding 4.1 square miles above the outlet of Silver Lake. Major tributaries to the Jones River are Pine Brook and Halls Brook which originate in Duxbury; Jones River Brook which drains sections of Plympton and Kingston; and Fountainhead Brook and Smelt Brook which originate in Kingston. Two major impoundments are joined at Route 106 and Elm Street, the latter of which is considered the end of the freshwater portion of the river. The USGS maintains a flow-gaging station located just downstream of the Elm Street Impoundment which drains an area of 15.9 square miles. Over the last 17 years, the gage has recorded an average flow of 31.5 cfs with maximum and minimum flows of 575 cfs and 6.59 cfs, respectively.

The remainder of the South Shore Basin include several small streams including the Eel, Bluefish, and Duck Hill Rivers; Beaver Dam, and Indian and Town Brooks which discharge to Cape Cod Bay.

Water Quality Conditions and Trends

For many years, domestic and industrial wastewater in Weymouth, Abington, Rockland, and Scituate had subjected the North River, in particular the freshwater portion upstream of Curtis Crossing, to high loadings of oxygen-demanding and nutrient-laden pollutants. Discharges from the Naval Air Station in Weymouth, Plymouth Rogers Division - Colonial Provision Company in Abington and Clark-Bubbitt Foods in Rockland, which severely polluted the North River, had been eliminated by 1977. However, dissolved oxygen levels remained low and nutrient loads remained high due to the North Abington and Rockland Wastewater Treatment Plants. For this reason the Rockland Wastewater Treatment Plant was expanded and upgraded to an advanced treatment facility that began operation in the summer of 1982. Wastewater discharges from North Abington were sewered to the Rockland plant. By February 1984 all discharges from the North Abington Wastewater Treatment Plant had been eliminated.

These improvements have increased dissolved oxygen levels and substantially decreased nutrient loadings to the freshwater portion of the North River. However natural conditions in the adjoining wetlands, urban runoff in Rockland, and failing septic systems in Hanover prevent the North River from continually meeting its classification. Isolated wastewater discharges in North Abington and Rockland and runoff from Rockland, North Abington and the Weymouth Naval Air Station cause high coliform levels and slighly elevated nutrient concentrations.

High concentrations result from the process of ammonia removal at the Rockland Wastewater Treatment Plant. These concentrations persist two miles downstream of the effluent channel. Phosphorus concentrations, although greatly reduced, are still significant with respect to eutrophication in the impoundments. Some of this phosphorus appears to be natural background concentration.

Downstream of Curtis Crossing dam where the North River is subject to tidal influences, coliform concentrations increased from 1975 to 1983, preventing the entire segment from meeting its class SB and SA standards. As a result of receiving high levels of coliform bacteria along the North and South Rivers, the shellfish beds in the lower estuary were closed seasonally, while upstream areas were closed permanently. Due to the deterioration in water quality and associated river uses caused by increased development in the North River Basin, a water quality management study for the North and South Rivers was completed. A major source of bacterial pollution identified was dry weather discharges from four storm drains - two on the North River, one on the South River and one on First Herring Brook. Storm drain discharges during wet weather conditions, although of limited duration, contributed considerable bacterial loads. Additional sources included overland runoff, decomposing organic matter from wetland areas, waterfowl, septage discharges from watercraft, and illegal dumping of pumped septage which also were potential sources of nutrients. The most significant source of nutrients, BOD, and total suspended solids was the Scituate WWTP which affected First Herring Brook. Various pollution abatement strategies were presented; the three primary strategies recommended for implementation included storm drain rehabilitation, and maintenance, repair of subsurface disposal systems and modifications to the Scituate WWTP. Further water quality and bacterial sampling in the North River during dry weather in 1987

determined that the portion of the estuary from Dwellys Creek in Norwell to Route 3A in Scituate received the highest coliform counts to the North River. The next study will concentrate on this area. Additional storm drains and areas with suspected subsurface disposal failure will be identified. The storm drains flowing during dry weather will be evaluated first and measures will be developed to eliminate direct connections to surface drains.

The Scituate Wastewater Treatment Plant has experienced problems with overloading of its sand filter beds which are used to dispose of the effluent. A facility plan was completed in December 1984 that recommended the design and construction of a mechanical filtration system with chlorination-dechlorination facilities. Alternatives for the discharge of effluent from this plant will be evaluated in outfall siting studies to be conducted in 1988. These alternatives will include discharge to the tidal estuary, discharge through an ocean outfall, and discharge by either onsite or offsite land application.

The completion of the upgraded treatment plant will help reduce bacteria levels in the estuary; however, recent studies by the DWPC's Technical Services Branch and BSC (discussed above) indicate that other, significant sources of bacteria exist in the basin. Continued studies are planned which are aimed at locating the sources and recommending actions to eliminate them.

The remaining surface waters of the South Shore drainage are standard in terms of water quality. The town of Kingston is currently evaluating wastewater collection and treatment alternatives for the Rocky Brook area to eliminate septic tank failures which have caused elevated coliform counts in the Jones River estuary. Cohasset will be completing a facility plan for upgrading its treatment plant and collection system. The Plymouth Wastewater Treatment Plant has high inflow/infiltration problems, which have been evaluated.

The South Shore Coastal drainage area as a whole is subjected to seasonal water quality degradation as a result of increased population during the summer months. The number of failing septic systems increases seasonally due to increased use, improper maintenance, and fluctuations in groundwater levels. Another problem plaguing the coastal communities is the discharge of wastes from marine vessels moored in the harbors. As noted, these problems are accentuated in the summer months with a large influx of seasonal residents, vacationers, and tourists. However, a long term effect on the quality of surface waters and groundwater will most likely occur as the demand for drinking water increases and the population continues to grow. The delicate balance between groundwater withdrawal and groundwater discharge to surface water bodies must be maintained to insure the high quality of both.

REFERENCES

Massachusetts Division of Water Pollution Control. 1971. Data Record on Water Quality, North River 1971. Boston, Massachusetts. 61 pp.

_____. 1975. The North River Water Quality Survey Data. Westborough, Massachusetts. 90 pp.

_____. 1975. The North River Planning Area Water Quality Management Plan. Westborough, Massachusetts. 69 pp.

_____. 1975. South Coastal Water Quality Management Plan. Westborough, Massachusetts. 54 pp.

_____. 1977. South Coastal Water Quality and Wastewater Discharge Data, 1976. Westborough, Massachusetts. 72 pp.

_____. 1977. The North River Basin, French Stream, Water Quality Data, Wastewater Discharge Data. Westborough, Massachusetts. 53 pp.

_____. 1982. The South Coastal Drainage Basin, the Jones River 1981 Water Quality Data. Westborough, Massachusetts. 27 pp.

_____. 1984. The North River Basin 1983 Water Quality and 1983, 1982, and 1981 Wastewater Discharge Data. Westborough, Massachusetts. 129 pp.

_____. 1987. The North River Basin, Water Quality Management Plan. Westborough, Massachusetts. 41 pp.

Figure 28

SOUTH SHORE COASTAL DRAINAGE AREA (94)

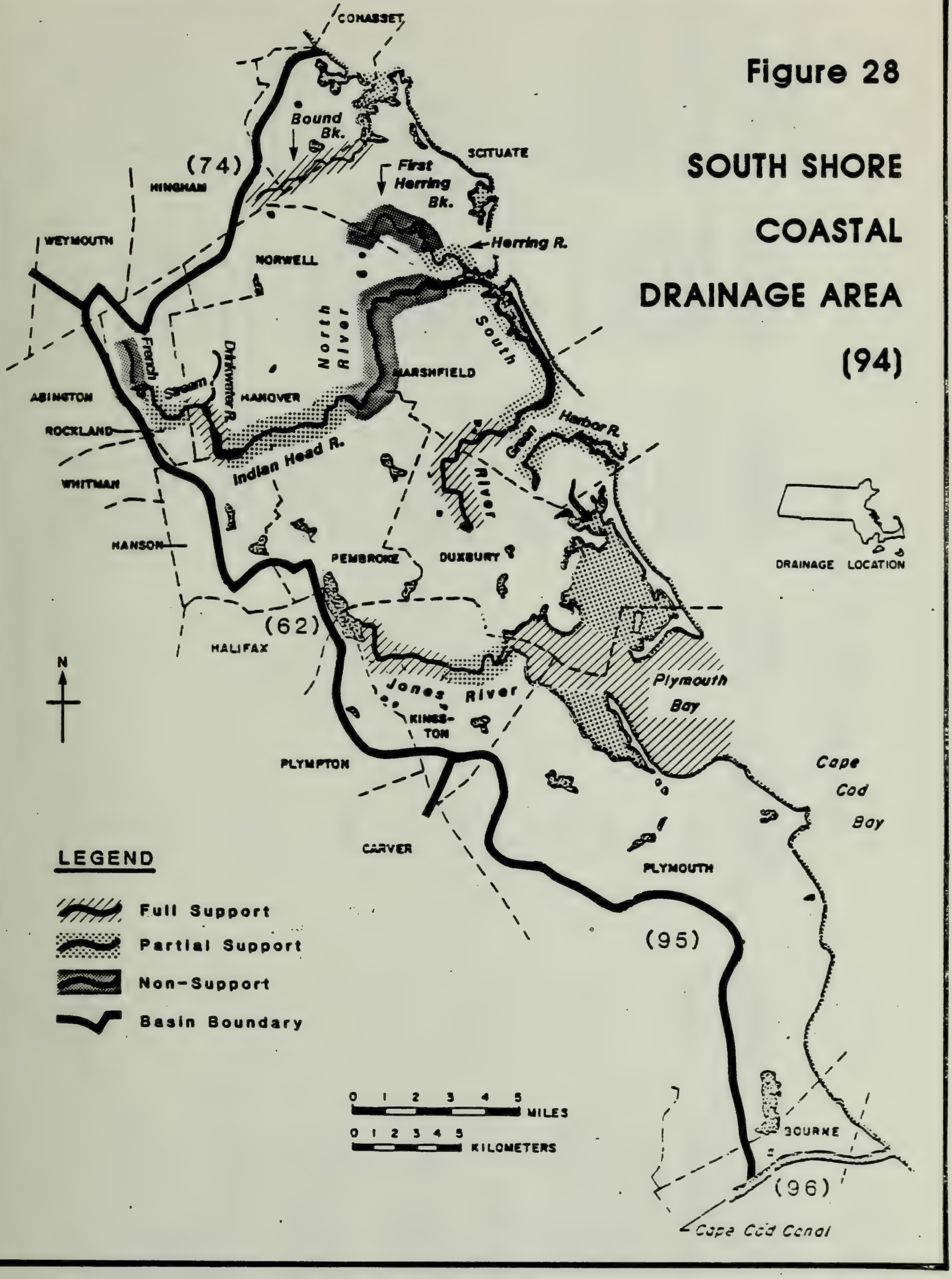


TABLE 26
SOUTH SHORE COASTAL DRAINAGE AREA

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Cohasset Harbor, Cohasset	0.83 mi^2	SA	PS	Fecal coliform bacteria, Shellfish bans Nutrients	-Cohasset WWTP -Wetlands -Residential runoff	-Upgrade Cohasset WWTP to provide secondary treatment. -Non point source controls.
Scituate Harbor, Scituate	0.31 mi^2	SA	PS	Fecal coliform bacteria, Shellfish bans	-Unknown	-Eliminate/treat sources.
North River						
Weymouth Naval Air Station to inlet Studleys Pond, Rockland	20.6-18.9	B/WWF	NS	Fecal coliform bacteria	-Untreated wastewater discharges -Surface runoff	-Eliminate/treat sources.
Studleys Pond to Rockland WWTP, Rockland	18.9-17.0	B/WWF	PS	Fecal coliform bacteria Dissolved oxygen Phosphorus	-Surface runoff -Wetlands	--
Rockland WWTP to outlet Factory Pond, Hanover	17.0-14.0	B/WWF	S	Dissolved oxygen Phosphorus	-Wetlands -Natural conditions	--
Outlet Factory Pond to Curtis Crossing Dam, Hanover-Pembroke	14.0-11.6	B/SCWF	PS	Fecal coliform bacteria Dissolved oxygen Nutrients	-Subsurface disposal -Wetlands	-Septic tank rehabilitation/ maintenance.

TABLE 26 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Curtis Crossing Dam to Third Herring Brook, Hanover	11.6-9.6	SB/AD	PS	Dissolved oxygen Fecal coliform bacteria	-Wetlands -Storm drains -Subsurface disposal	Study underway to address sources and recommend plan to eliminate/ treat these sources.
Third Herring Brook, Hanover to Dwelleys Creek, Norwell	9.6-6.5	SA/AD	NS	Fecal coliform bacteria	-Septic disposal -Practices -Illegal dumping of septage	-Develop septage management plan.
Dwelleys Creek to Rte. 3A, Scituate	6.5-2.0	SA/AD	NS	Fecal coliform bacteria	-Storm drains -Subsurface disposal	-Study will address problems.
Route 3A to mouth	2.0-0.0	SA/AD	PS	Fecal coliform bacteria, Shellfish bans	-First Herring Brook sources	--
First Herring Brook Outlet, Old Oaken Bucket Pond, Scituate to Simms Marina	4.0-2.2	SA/AD	NS	Fecal coliform bacteria	-Septic system leaching -Storm drains	-Cooperation with town of Scituate.
Simms Marina to Scituate WWTP channel	2.2-0.5	SA/AD	PS	Fecal coliform bacteria	-Watercraft -Septic systems	-Pump out facility. -Eliminate sources.
Scituate WWTP channel to North River	0.5-0.0	SA/AD	PS	Fecal coliform bacteria Nutrients	-WWTP	--
South River Above Main Street, Marshfield	10.6-6.7	B/AD	S	--	--	--

TABLE 26 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Main St. to Bourne Park Ave., Marshfield	6.7-4.6	SA/AD	NS	Fecal coliform bacteria Dissolved oxygen	-Storm drains -Subsurface disposal -Wetlands	-Eliminate sources. -Maintenance
Bourne Park Ave. to Broad Creek, Marshfield	4.6-1.2	SA/AD	PS	Fecal coliform bacteria Dissolved oxygen	-Carry over -Wetlands	--
Broad Creek to Marshfield	1.2-0.0	SA/AD	PS	Fecal coliform bacteria, Shellfish bans Dissolved oxygen	-Subsurface disposal near Broad Creek -Wetlands	-Maintenance
Green Harbor River, Marshfield	2.5-0.0	B/WWF/AD	PS	Dissolved oxygen Nutrients Fecal coliform bacteria, Shellfish bans	-Wetlands -Failing septic systems	-Septic system rehabilitation/ maintenance
Jones River to Elm Street, Kingston	7.0-3.4 3.4-2.5	B/SCWF/AD B/SCWF	S	Dissolved oxygen	-Wetlands	--
Jones River estuary, Kingston	2.5-0.0	SA	PS	Fecal coliform bacteria Shellfish bans	-Untreated domestic wastewater discharges	-Eliminate/treat sources.
Duxbury Bay, Kingston	13.46 mi^2	SA	PS	Fecal coliform bacteria Shellfish bans	-Unidentified nonpoint runoff	-Identify sources, recommend appropriate abatement needs.

TABLE 26 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Plymouth Harbor, Plymouth	2.61 mi^2	SA	PS	Fecal coliform bacteria Shellfish bans	-Plymouth WWTP. -Combined sewer overflows -Boating discharges -Storm drains	-Treatment/ elimination of known discharges to harbor, including those from boats.
Plymouth Bay, Plymouth	--	SA	S	--	--	--
Bound Brook, source to outlet, Hunter Pond, North Scituate	4.6-0.0	B/CWF/AD	S	--	--	--
Gulf River, outlet Hunter Pond to Cohasset Harbor	2.4-0.0	SA	S	--	--	--

Miles Assessed: 51.7 mi
Miles Supporting Classification: 18.4 mi
Miles Partially Supporting Classification: 20.1 mi

Square Miles Assessed: 17.21 mi^2
Square Miles Supporting Classification: 12.86 mi^2
Square Miles Partially Supporting Classification: 4.35 mi^2

STONY BROOK BASIN (84b)

Description of the Watershed

Stony Brook originates between Ayer and Littleton as Beaver Brook and flows generally northeast through Littleton, Westford and North Chelmsford where it enters the Merrimack River. In its 22 mile length, it drains an area of approximately 51 square miles and falls 200 feet. Dams create many impoundments along its entire length. The mainstem is fed by numerous small brooks and streams along its path to the Merrimack River. The basin also includes a number of lakes and ponds very suitable for recreational activities. Among these, Long Sought-for Pond in Westford provides excellent trout fishing.

There are two significant wastewater discharges within the Stony Brook Basin; apple processing and juice bottling at New England Apple Products in Littleton, and metals processing at Westford Anodizing.

Water Quality Conditions and Trends

Water quality conditions in this small sub-basin of the Merrimack River is dominated by impoundments or ponds along its 22 mile length, generally flat gradient and adjacent wetlands, and industrial discharges. The effluent from New England Apple Products is carried by Mill Brook and affects the water quality in Mill Pond.

The combination of these factors contribute to low dissolved oxygen concentrations and fluctuations, nutrient loadings which cause excessive algal and macrophytic growth, and localized high coliform levels especially in Chelmsford. Sewering in North Chelmsford will be completed in late 1988. In addition, repairs of on-site disposal systems should be initiated as recommended in the 1984 facilities plan for Chelmford. Surface runoff in Chelmsford may also contribute elevated coliform counts.

REFERENCES

Massachusetts Division of Water Pollution Control 1974. Part A Stony Brook. Westborough, Massachusetts. 51 pp.

_____. 1974. Part C Stony Brook. Westborough, Massachusetts. 50 pp.

_____. 1987. Stony Brook Water Quality Data and Wastewater Discharge Data. Westborough, Massachusetts. (in preparation).

Figure 29

STONY BROOK BASIN (84b)

TABLE 27
STONY BROOK BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Beaver Brook						
Wolf Swamp, Mill Brook, to Mill Pond at Route 110-2A, Littleton	17.5-15.6	B/SCWF/AD	NS	Dissolved oxygen	-Industrial source -Wetlands	-Place stronger limits for BOD and nutrients on discharge.
				Fecal coliform bacteria	-Wetlands	
				Nutrients	-Industrial source	
Route 110-2A through Forge Pond to Stony Brook at Concord Road, Route 225, Westford	15.6-10.3	B/SCWF/AD	PS	Dissolved oxygen Fecal coliform bacteria Nutrients	-Wetlands -Wetlands -Surface runoff -Wetlands	-BMP
Stony Brook						
Concord Road Route 225, to Chamberlin Road, Westford	10.3-3.3	B/SCWF/AD	PS	Dissolved oxygen Fecal coliform bacteria	-Wetlands -Wetlands -Surface runoff	-BMP
Chamberlin Road to mouth, Merrimack River	3.3-0.0	B/SCWF/AD	NS	Fecal coliform bacteria	-Urban runoff -Untreated discharges -Subsurface disposal	-Sewering underway. -Repair of on-site systems.

Miles Assessed: 17.5 mi
Miles Supporting Classification: 0.0 mi
Miles Partially Supporting Classification: 12.3 mi

SUDBURY AND CONCORD RIVER BASINS (82b)

Description of the Watershed

The Sudbury River has its beginning in the town of Westborough, flowing from Cedar Swamp Pond eastward to Framingham, then north through the towns of Sudbury, Wayland, Lincoln, and into the town of Concord. The Sudbury River is characterized by three distinct physical sections. Upstream of Framingham, the river is narrow, rapidly-flowing and dotted with a few small impoundments. In Framingham, the river has two large impoundments: the first is part of the Metropolitan District Commission (MDC) water supply, and the second is created by the Colonna Dam in Saxonville. The third and unique section of the river is that which flows through the Great Meadows National Wildlife Refuge meadowlands in the towns of Sudbury, Wayland, Lincoln, and Concord. Through this area (river distance of 12 miles), the river's elevation changes only one foot and the river is akin to an elongated lake.

The Sudbury River is 41 miles long with a drainage area of 160 square miles, 29 of which drain to the MDC reservoirs. In Concord, the Sudbury River joins the Assabet River to form the Concord River.

The Concord River flows north through the towns of Concord, Carlisle, Bedford, Billerica, and the city of Lowell where it discharges into the Merrimack River. The Concord River retains the slow-moving characteristic of the Sudbury River as it flows north through the Great Meadows Wildlife Refuge area. From the Talbot Dam in Billerica, it is an urban river, receiving industrial and municipal discharges in the Lowell area.

The Concord River is 15.8 miles long and drains 62 square miles for a combined total (including the Assabet and Sudbury Rivers) of 406 square miles. The Concord River Basin has two main urban centers in Lowell and Concord and some rural areas such as in Carlisle.

A major tributary to the Concord River is River Meadow Brook which has a drainage area of 25.7 square miles, primarily in the town of Chelmsford. The United States Geological Survey (USGS) maintains one flow gaging station on the Sudbury River in Saxonville. One USGS flow gaging station is maintained on the Concord River in Lowell.

Water Quality Conditions and Trends

Unlike the Assabet River, which has to contend with a number of WWTP discharges in close proximity, the Sudbury and Concord Rivers are relatively free of such impacts. However, natural conditions in the Sudbury and Concord basins, compounded by urban runoff, prevent the Sudbury and Concord Rivers from maintaining a class B condition along their full lengths. With the elimination of the combined sewer overflows in 1980 by routing the combined wastewater to the Duck Island Wastewater Treatment Plant in Lowell, much of the Concord River is partially meeting its class B standards.

The 1986 survey data on the Sudbury River showed that elevated coliform counts occurred after rainfall, even in the upper portion. The highest fecal coliform

counts occurred as the river entered Concord. The most persistent high counts occurred at the Framingham/Wayland town line.

The Metropolitan District Commission (MDC) maintains a number of reservoirs in the Sudbury basin. Currently MDC is investigating the feasibility of using water from the Sudbury River to supplement the reservoir yield. However, although the Sudbury River water appears to be suitable as a water supply source (with subsequent treatment), the designation of an Ashland hazardous waste site as a U.S. EPA Superfund site might affect the MDC's decision.

In 1985, the extent of mercury, chromium and lead in sediment and fish (pickerel, brown bullhead, white perch and black crappie) were investigated. Edible fillets from five fish at each of six different locations along the river were analyzed. Mercury was the only metal detected in significant quantities, and nine fish had mercury concentrations at or above the FDA standard of 1.0 ppm. The highest concentration was 5.2 ppm in a pickerel, in the reservoir below the hazardous waste site. Again, other metals were not detected in significant quantities, the presence of mercury in fish resulted in a warning on eating the fish on the entire Sudbury River. Five sediment samples were taken from the same locations and mercury as high as 76 ppm was detected in sediment samples from the station near the hazardous waste site. During 1986 surveys, metals, volatile and extractable compounds were analyzed in water samples, while metals, polynuclear aromatic compounds (PAH's) and PCB's were analyzed in sediment samples. These analyses were conducted mainly to determine the suitability of the upper Sudbury River as a water supply.

The water quality data showed the presence of several volatile compounds--mainly methylene chloride, trichloroethylene (Reservoir #2 only), or toluene. The presence of trichlorethylene is critical because it is a carcinogen. No extractable compounds were detected. Metals concentrations were all below detection limits in the water. Sediment data showed the presence of PAH's mainly in Reservoir #2; PCB's were detected in Reservoir #2. Neither was detected in Reservoir #1. The effect of the PAH's is not known, the PCB concentration is insignificant. Metals data again showed high concentrations of mercury through Saxonville Pond. Chromium and copper concentrations were also high in Reservoir #2. The concentrations of lead and zinc were much higher in Saxonville Pond than in the reservoir.

Secondary contact recreation is quite popular on the Sudbury and Concord Rivers. The Great Meadows National Wildlife Refuge is a large flood-plain in which the rivers languidly flow, making it ideal for canoeing and bird-watching. The Sudbury River in Hopkinton and Ashland is stocked with trout by the Massachusetts Division of Fisheries and Wildlife.

On the Concord River, the current upgrading of the Concord and Billerica WWTP's will improve water quality below the respective discharges. These improvements, along with the elimination of the Lowell CSO's, will have a significant impact on improving water quality. Septic system rehabilitation/maintenance and runoff control might be necessary in some areas to achieve class B standards.

River Meadow Brook through Chelmsford is severely impacted by failing septic systems. In 1987 the town began sewering the problem areas. This will take

several years to complete, but will improve the river's water quality considerably.

A major tributary to the Sudbury River is Hop Brook. Hop Brook is severely impacted at its headwaters by nutrients from the Marlborough-Easterly WWTP, despite the fact that the WWTP is well operated and practices both nitrification and phosphorus removal. Unfortunately a series of impoundments allows for the accumulation of these nutrients in the water column and in sediments. Extremely dense algal populations coupled with extreme diurnal dissolved oxygen swings result in significant water quality violations, which limits use of Hop Brook for recreation and/or water supply.

Diversion of the WWTP discharge from Hop Brook is a possible solution but a costly one. A long term result of diversion would be increased recreational fishing in the impoundments and improved aesthetics. The time for the impoundments to recover after diversion of the discharge has not been determined.

The Concord River occasionally experiences dissolved oxygen variations on the upper section due to its extensive travels through the wetlands. This is a natural condition and cannot be corrected.

River Meadow Brook, the major tributary to the Concord River, experiences severe water quality violations due to failing septic systems. The town has always relied on on-site disposal systems. The soil is not adequate to treat the wastes and thus the brook has received high fecal coliform (>1000 org/100ml) nutrient and chloride concentrations. The town of Chelmsford is currently being sewered and the problem should be corrected.

REFERENCES

Massachusetts Division of Water Pollution Control. 1976. Nutting Lake Water Quality Study April 1974 - April 1975. Westborough, Massachusetts. 68 pp.

_____. 1980. Concord and Sudbury River Basin 1979 Water Quality Survey Data. Westborough, Massachusetts. 130 pp.

_____. 1981. The Sudbury-Assabet-Concord Basin Water Quality Management Plan. Westborough, Massachusetts. 52 pp.

_____. 1982. Sudbury-Assabet-Concord River Basin 1981 and 1982 Wastewater Discharge Survey Data. Westborough, Massachusetts. 48 pp.

_____. 1985. Sudbury River Water Quality, Sediment, and Fish Survey Data (Unpublished data on file at Westborough, Massachusetts office).

_____. 1986. Concord River Survey 1986 Water Quality Data, Wastewater Discharge Data and Water Quality Analysis. Westborough, Massachusetts. 75 pp.

_____. 1988. Sudbury River Water Quality Survey Data, Wastewater Discharge Data 1986. Westborough, Massachusetts. 42 pp.

Figure 30

SUDBURY AND CONCORD RIVER BASINS (82a)

BASINS LOCATION

LEGEND

- Full Support
- Partial Support
- Non-Support
- Basin Boundary

TABLE 28
SUDBURY AND CONCORD RIVER BASINS

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Sudbury River						
Headwaters in Westborough to inlet to Reservoir No. 2, Ashland	32.7-23.2	B/SCWF/AD	PS	Fecal coliform bacteria	-Surface runoff	-BMP
Inlet to Reservoir No. 2, Ashland to Saxonville Pond, Framingham	23.2-16.2	B/CWF/AD	NS	Metals including mercury in sediment Fecal coliform bacteria	-In-place sediments -Surface runoff	-Clean up hazardous waste site. Dredge channel.
Saxonville Pond outlet to confluence with Hop Brook, Wayland	16.2-10.6	B/AL/AD	PS	Fecal coliform bacteria	-On-site wastewater systems	-BMP
Confluence with Hop Brook to Lincoln town line	10.6-4.5	B/AL	PS	Dissolved oxygen Fecal coliform bacteria	-Wetlands	--
Lincoln town line to confluence with Assabet River, Concord	4.5-0.0	B/AL	PS	Dissolved oxygen	-Wetlands	--
Hop Brook						
Marlborough WWTP discharge to Stearns Pond, Sudbury	9.7-5.5	B/WWF	NS	Dissolved oxygen Nutrients, Algae	-WWTP dominates flow	-Diversion of WWTP discharge to Sudbury River. Dredging of impoundments.
Stearns Pond outlet to confluence with Sudbury River, Wayland	5.5-0.0	B/WWF	PS	Fecal coliform bacteria Nutrients	-Surface runoff -Carryover from upstream	--

TABLE 28 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Concord River						
Confluence of the Sudbury and Assabet Rivers to the Billerica WWTP, Billerica	15.4-6.1	B/WWF	S	Dissolved oxygen Nutrients	-Natural conditions -Upstream conditions	--
Billerica WWTP to Lowell Canal, Lowell	6.1-0.3	B/WWF	PS	Fecal coliform bacteria	-Billerica WWTP -River Meadow Brook	-WWTP is being upgraded
Lowell Canal, Lowell to confluence with Merrimack River, Lowell	0.3-0.0	B/WWF	NS	Fecal coliform bacteria	-CSOs -Raw sewage discharges	-Eliminate CSOs
River Meadow Brook Russell Mill Pond to confluence with Concord River, Lowell	6.1-0.0	B/WWF/AD	NS	Fecal coliform bacteria	-Failing septic systems in Chelmsford	-Chelmsford is being sewered

Miles Assessed: 63.9 mi
Miles Supporting Classification: 9.3 mi
Miles Partially Supporting Classification: 37.0 mi

TAUNTON RIVER BASIN (62)

Description of the Watershed

The Taunton River Basin is located in southeastern Massachusetts, with its extensive network of tributaries draining an area of 530 square miles. The Taunton River is formed at the confluence of the Matfield and Town Rivers in Bridgewater. The river is 40 miles in length and flows in a southerly direction to Mount Hope Bay, a sub-basin of the Narragansett Bay watershed. The Taunton River has an extremely flat gradient, ranging from 20 feet at its origin, to sea level at the estuary. The low slope causes extensive amounts of wetland areas that are characteristic of the drainage basin. The river is fairly uniform in width in its freshwater portion and then broadens into an estuary. Salt water intrusion occurs upstream to river mile 12 and tidal influence occurs upstream to river mile 18.

The watershed has a myriad of tributaries and sub-tributary systems that contribute to the flow of the main stem of the Taunton River. At the headwaters of the basin, the Salisbury Plain and Satucket Rivers are the main contributors to the Matfield River while Coweeset and Queset Brooks are tributaries to the Town River. This portion of the basin is referred to as the Upper Taunton River section. In the eastern portion or Lower Taunton River section, the Winnetuxet, Nemasket and Assonet Rivers are the major sources of flow to the river, while the Mill, Three Mile and Segreganset Rivers are the major drainage areas in the western portion of the basin, often referred to as the Rumford/Three Mile section.

The United States Geological Survey (USGS) presently operates four stream gages in the river basin. The USGS formerly maintained a stream gage on the Taunton River in Bridgewater. This gage was discontinued in 1976, measured flow from an area of 260 square miles or 49 percent of the entire Taunton River Basin. The average annual discharge for the 46 years of record was 480 cubic feet-per-second.

The average discharge and drainage area for the remaining four stream gages are: Wading River (two gages) - 31.7 cfs, 19.2 mi^2, and 75 cfs, 43.3 mi^2; Threemile River - 169 cfs, 84.3 mi^2; and Segreganset River - 22.0 cfs, 10.6 mi^2.

Water Quality Conditions and Trends

The waters of the Taunton River Basin have been historically subjected to significant inputs of wastewater discharges and, consequently, have demonstrated serious water quality problems. Currently there are 23 major industrial and municipal wastewater dischargers that have NPDES (National Pollutant Discharge Elimination System) permits in the Taunton River Basin. Seven of these are municipal wastewater treatment facilities or publicly owned treatment works (POTW's) located in Bridgewater, Brockton, Taunton, Mansfield, Fall River, Somerset, and Middleborough. Over the past ten years pollution abatement projects have been completed, and these municipal facilities were upgraded and expanded. Also, industrial discharges received treatment or have tied into POTW's with pretreatment, and some discharges have been eliminated completely,

i.e., gone out of business. A current pollution abatement project is the construction of lateral sewers and interceptors to alleviate water quality problems stemming from failing subsurface disposal systems. The three main sections within the Taunton River Basin each receive wastewater discharges and have water quality problems associated with these discharges. In the upper portion of the basin, the Town and Matfield Rivers receive discharges from Brockton and Bridgewater wastewater treatment plants. These rivers have historically been subjected to severe oxygen depletion, periodic bacterial contamination, heavy metal inputs and accelerated eutrophication. Upgrading and expanding of the Brockton WWTP to advanced wastewater treatment will improve water quality conditions in both the Matfield and Salisbury Rivers.

An ongoing pollution abatement project in the Upper Taunton River section includes the town of Whitman's construction of an interceptor and lateral sewer tie in to the Brockton WWTP. Upon completion in late 1987, water quality problems from failing septic systems will be eliminated in the areas of the Shumatuscacant River and Meadow Brook. The Bridgewater WWTP will be upgraded to advanced wastewater treatment, with completion projected for 1989.

The lower portion of the basin receives discharges within the city of Taunton. This includes numerous industrial discharges, primarily plating operations, and the Taunton WWTP discharge to the Taunton River. In 1978 the Taunton WWTP was upgraded to an 8.4 MGD pure oxygen, activated sludge, advanced wastewater treatment system. Some industrial discharges have been eliminated by being tied into the Taunton WWTP with pretreatment. Survey data in 1986 showed improvement in dissolved oxygen levels downstream due to the combined effect of reduction in organic loadings and the nitrification process at the Taunton WWTP. Significant improvement in water quality was also recorded for the Nemasket River. This can be attributed to upgrading the Middleborough WWTP to advanced treatment, which produces an effluent with an extremely low oxygen demand.

The third area of the Taunton River Basin is the Rumford/Three Mile section. The Mansfield WWTP up until summer 1985, discharged to Back Bay Brook, a tributary to the Norton Reservoir. This discharge created severe water quality problems and added nutrients to the reservoir, which accelerated its eutrophication. During the summer of 1985, the Mansfield WWTP discharge was relocated to the Three Mile River below Norton Reservoir. This facility provides for advanced wastewater treatment. River sampling programs will be conducted in the future to document improvements in water quality within this area.

The expansion of the Mansfield WWTP provided for flows from Foxborough within the Robinson Brook area. This abatement project is presently in Step III, or the construction phase. The completed interceptor and lateral sewers will eliminate Foxborough's discharge to Robinson Brook during 1988.

In summary, the water quality of the Taunton River and its tributaries, which was poor for decades, has been improved significantly in the past decade.

Water quality problems are dominated by point sources, WWTP's and CSO's. Nonpoint sources are limited to surface runoff in Brockton which affects the Salisbury River, Trout Brook, and Beaver Brook; stormwater in East Bridgewater which also affects Beaver Brook; subsurface disposal in Freetown which affects

the Assonet River, and surface runoff in Bridgewater and Taunton which slightly impacts the Taunton River.

REFERENCES

Massachusetts Division of Water Pollution Control. 1975 Taunton River Basin Water Quality Data. Westborough, Massachusetts. 224 pp.

_____. 1980. Taunton River Basin 1975 Water Quality Analysis. Westborough, Massachusetts. 150 pp.

_____. 1979. Taunton River Basin Wastewater Discharge Survey Data 1975, 1976, 1978, 1979. Westborough, Massachusetts. 133 pp.

_____. 1981. Taunton River Basin Water Quality Management Plan Update. Westborough, Massachusetts. 72 pp.

_____. (unpublished). Rumford/Threemile River Section, Taunton River Basin 1983. Westborough, Massachusetts. 5 pp.

_____. 1977. South Watappa Pond 1974-1975 Water Quality Study. Westborough, Massachusetts. 68 pp.

_____. 1977. Baseline Water Quality Studies of Selected Lakes and Ponds in the Taunton River Basin. 85 pp.

_____. 1988. Taunton River Basin 1986 Water Quality Survey Data. Westborough, Massachusetts. (in preparation).

Figure 31 TAUNTON RIVER BASIN (62)

TABLE 29
TAUNTON RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Taunton River from the confluence of the Town and Matfield Rivers to Route 24 bridge, Taunton	40.8-21.2	B/WWF	PS	Fecal coliform bacteria Dissolved oxygen Nutrients	-Urban runoff -Brockton WWTP -Bridgewater WWTP	-Brockton WWTP upgraded plant -Bridgewater WWTP upgraded
Route 24 bridge, Taunton to the Berkley Bridge, Dighton	21.2-13.0	SB	PS	Dissolved oxygen Fecal coliform bacteria	-Upstream sources -CSOs	-Upstream control measures will reduce problems -CSO control
Berkley Bridge, Dighton to Fall River city line	13.0-7.5	SB	PS	Dissolved oxygen	-Unknown	--
Fall River city line to the mouth of Mount Hope Bay, Fall River	7.5-0.0	SB	PS	Fecal coliform bacteria	-CSOs	-CSO control needed
Matfield-Salisbury Rivers from Prospect Street, Brockton to Brockton WWTP	53.3-48.5	B/WWF	PS	Fecal coliform bacteria	-Surface runoff	-Runoff control
Brockton WWTP to confluence with the Town River, Bridgewater	48.5-40.8	B/WWF	PS	Dissolved oxygen Nutrients Fecal coliform bacteria	-Brockton WWTP -Surface runoff	-- -Runoff control
Trout Brook from Route 28, Avon to confluence with the Salisbury Plain River, Brockton	4.0-0.0	B/WWF/AD	PS	Dissolved oxygen Fecal coliform bacteria	-Surface runoff	-Possibly urban runoff control; source of problem not clearly defined.

TABLE 29 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Beaver Brook from Groveland St. to confluence with the Salisbury Plain River, East Bridgewater	5.5-0.0	B/WWF/AD	PS	Dissolved oxygen Fecal coliform bacteria	-Wetlands -Stormwater	-Undefined -Nonpoint source pollutant control.
Satucket-Shumatusacacant Rivers from Central St., Abington to confluence with the Matfield River, East Bridgewater	14.4-0.0	B/WWF/AD	S	Dissolved oxygen	-Wetlands	-Sewer construction is being conducted in Whitman.
Town - Hockomock Rivers from the confluence of Queset and Coweeset Brooks to Rte. 28 bridge, West Bridgewater	11.7-5.0	B/WWF/AD	S	Dissolved oxygen	-Wetlands	-Vast areas of wetlands causes naturally low dissolved oxygen.
Route 28 bridge to Bridgewater WWTP	5.0-1.7	B/WWF/AD	S	--	--	--
Bridgewater WWTP to confluence with Matfield River, Bridgewater	1.7-0.0	B/WWF	PS	Dissolved oxygen Fecal coliform bacteria	-Bridgewater WWTP	-WWTP is being upgraded.
Robinson Brook from Cocasset Street, Foxborough to confluence with Rumford River, Foxborough	3.0-0.0	B/WWF/AD	PS	Dissolved oxygen Fecal coliform bacteria Nutrients	-Wetlands -Foxborough Co. discharge	-Tie in Foxboro Co. to Mansfield WWTP.
Rumford/Threemile Rivers from headwaters to confluence with	18.4-0.0	B/WWF	PS	Dissolved oxygen Fecal coliform bacteria	-CSOs in Dighton	-CSO abatement.

TABLE 29 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Wading River from Spruce Street, Foxborough to confluence with Threemile River, Norton	11.3-0.0	B/SCWF	S	--	--	--
Segreganset River from Center St., Dighton to confluence with the Taunton River, Freetown	2.5-0.0	B/SCWF/AD	PS	Fecal coliform bacteria	-Unknown	-Further quantification of problem is required.
Assonet River from Route 74, Freetown to confluence with Taunton River, Freetown	6.0-0.0	B/WWF/AD	PS	Dissolved oxygen Fecal coliform bacteria	-Natural wetlands -Subsurface disposal in Freetown	--
Queset Brook from outlet of Longwater Pond, Easton to confluence with Coweeset Brook, West Bridgewater	2.8-0.0	B/WWF/AD	S	--	--	--
Coweeset Brook from Pearl Street, Brockton to confluence with Queset Brook, West Bridgewater	3.6-0.0	B/WWF/AD	S	--	--	--
Muddy Cove Brook from from outlet of pond, North Dighton to Confluence with Taunton River, North Dighton	0.8-0.0	B/WWF/AD	PS	Fecal coliform bacteria, Nutrients	--	--

TABLE 29 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Winnetuxet River from Route 58 to confluence with Taunton River, Halifax	6.7-0.0	B/CWF/AD	S	Dissolved oxygen	-Wetlands	-Natural conditions.
Nemasket River from Vaughan Street, to Plymouth St., Bridge, Middleborough	10.5-3.7	B/WWF/AD	S	--	--	--
Plymouth Street to confluence with Taunton River, Middleborough	3.7-0.0	B/WWF	PS	Dissolved oxygen Fecal coliform bacteria	-Surface runoff	-BMP
Canoe River headwaters to Snake River	18.2-8.0	B/SCWF/AD	S	--	--	--
Snake River from Canoe River to outlet of Lake Sabbatia, Taunton	8.0-3.1	B/WWF/AD	S	--	--	--
Mill River from outlet of Lake Sabbatia, Taunton to confluence with Taunton River, Taunton	3.1-0.0	B/WWF/AD	PS	Dissolved oxygen Fecal coliform bacteria	-CSOs in Taunton	-Control and/or elimination of CSOs.

Miles Assessed: 172.7 mi
Miles Supporting Classification: 70.7 mi
Miles Partially Supporting Classification: 102.0 mi

TEN MILE RIVER BASIN (52)

Description of the Watershed

The Ten Mile River is located in southeastern Massachusetts and eastern Rhode Island. The basin is a mere 54 square miles and the river's flowing length is 22 miles. The river flows in a north to south direction and empties into the Seekonk River which is a tributary to Narragansett Bay. The Ten Mile River, as shown in Figure 32 is a slow flowing, impounded river which receives numerous industrial and municipal wastewater discharges. The system has a long history of pollutant loadings and has faced a long uphill battle to reduce environmental degradation.

Water Quality Conditions and Trends

For over two centuries, the Ten Mile River Basin has been a center of industrial development, particularly in the jewelry manufacturing field. The industrial nature of the river basin engendered waste disposal and water quality problems. In 1964, none of the 65 discharges to the river system received any treatment and as a result, the river was severely degraded. However, by 1973, through an intensive program governed by the USEPA and the Massachusetts Division of Water Pollution Control and with significant cooperation from the industries, the pollutant problems were reduced but not entirely eliminated.

The Division and the USEPA undertook an intensive evaluation of the basin in 1984 to determine the extent of the remaining problems, particularly the effect of heavy metals on the water quality and the indigenous biota. The program determined that there was significant toxicity throughout the basin, including toxic discharges and very high levels of metals in sediments. As a result of this evaluation, discharge limitations were developed for all discharges to the river which severely limited the allowable toxic metals input. The reduction of loadings is being accomplished by tying pre-treated industrial discharges to the municipal treatment plants where further treatment is realized. The program should be completed by 1990; the remaining problem which needs to be addressed is the fate of the heavily contaminated sediment. The final solution, unknown at this time, will be environmentally difficult and expensive, but must be accomplished if the Ten Mile River is to meet standards and its potential water use.

The Ten Mile River, mainly urban in nature, is subject to problems typically associated with urban river systems. The delineation of the nonpoint problems has been difficult due to the preponderance and domination of point sources to the Ten Mile River. After the abatement programs reduce the point source inputs to minimal levels through the implementation and enforcement of the discharge permit program, the nonpoint problems can be addressed. The most important issue will be to reduce the toxic sediment; this may be accomplished by dredging, capping, or allowing natural sedimentation to seal the sediment from the overlying water column.

REFERENCES

Massachusetts Division of Water Pollution Control. 1973. The Ten Mile River, Part A, Water Quality Survey Data, 1973. Westborough, Massachusetts. 76 pp.

_____. 1980. The Ten Mile River, Water Quality Data, 1979. Westborough, Massachusetts. 35 pp.

_____. 1982. The Ten Mile River Basin, Water Quality Data, 1981. Westborough, Massachusetts. 89 pp.

_____. 1985. The Ten Mile River Basin, Water Quality Data Reports, A-F, 1984. Westborough, Massachusetts.

Figure 32 TEN MILE RIVER BASIN (52)

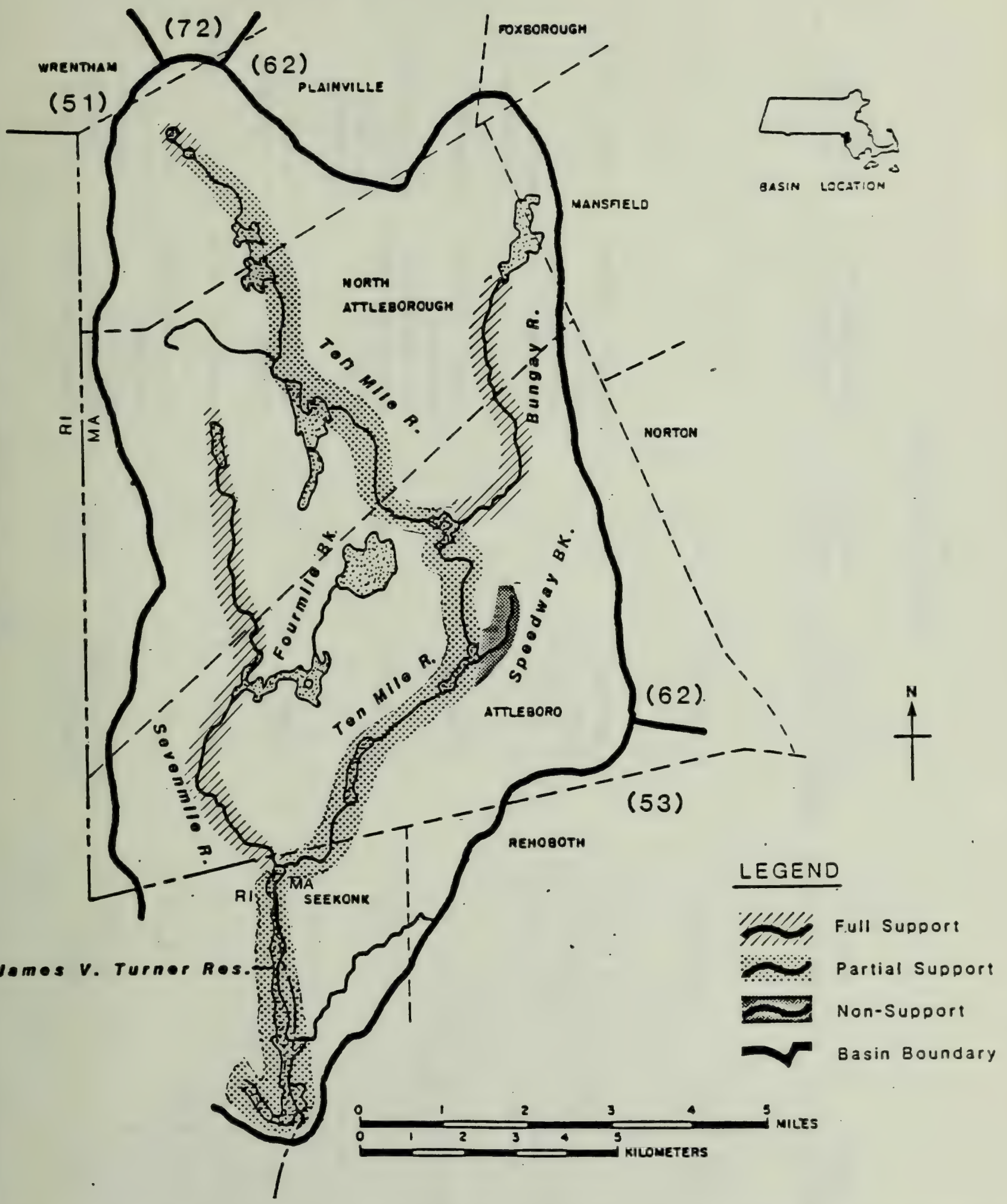


TABLE 30
TEN MILE RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Ten Mile River						
Headwaters to W. Bacon Street, Plainville	20.7-19.8	B/SCWF/AD	S	--	--	--
W. Bacon Street to N. Attleborough WWTP	19.8-19.3 19.3-15.5	B/WWF/AD B/WWF	PS	Fecal coliform bacteria Eutrophication Sediment	-Urban runoff -Historic discharges	-BMPs -Dredging
N. Attleborough WWTP to Attleboro WWTP	15.5-7.6	B/WWF	PS	Fecal coliform bacteria Eutrophication Dissolved oxygen Toxicity	-Runoff -Sediment -Discharges	-BMPs -Dredging -Metals removal.
Attleboro WWTP to Seekonk River, East Providence, RI	7.6-0.0	B/WWF	PS	Eutrophication Toxicity	-Runoff -Discharges	-BMPs -Increased treatment.
Speedway Brook						
Headwaters to Ten Mile River	0.9-0.0	B/WWF	NS	Fecal coliform bacteria Toxicity Aesthetics Dissolved oxygen	-DWOs -Industrial discharges	-Sewer connection. -Connection to WWTP.

TABLE 30 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Bungay River						
headwaters to Ten Mile River	4.0-0.0	B/SCWF	S	Dissolved oxygen	-Natural wetlands	--
Sevenmile River						
headwaters to Orrs Pond, Attleboro	6.0-3.0	A	S	--	--	BMPs to protect water supply
Orrs Pond to Ten Mile River, Attleboro	3.0-0.0	B/SCWF/AD	PS	Metals in fish	-Runoff -Fish migrating	-Consumption warning.

Miles Assessed: 31.6 mi
Miles Supporting Classification: 7.9 mi
Miles Partially Supporting Classification: 14.9 mi

WESTFIELD RIVER BASIN (32)

Description of the Watershed

The Westfield River Basin covers 517 square miles of west-central Massachusetts and includes portions of Franklin, Hampden, and Berkshire counties. Sparsely populated in the upper reaches, the basin's population is concentrated in the southeastern corner in the municipalities of Agawam, Holyoke, Westfield, and West Springfield.

The Westfield River begins in Savoy at a point over 2,000 feet above mean sea level. Flowing southeast, with ridges rising 500 to 900 feet above the adjacent valleys, the river remains mostly in its natural state, surrounded by second-and third-growth forest cover. Dropping 1,000 feet in the first 14 miles, the river swiftly makes its way to Huntington where it is joined by the middle and west branches.

The Middle Branch of the Westfield River begins in the town of Peru and flows 18 miles to join the main branch 27 miles above its mouth. Falling 1,250 feet along its course, the Middle Branch has a drainage area of 52.6 square miles and an average flow of 102 cfs at the United States Geological Survey gage just above its confluence with the main branch.

In Becket, the West Branch of the Westfield River is formed by the confluence of Depot and Yokum Brooks. This branch flows 17.5 miles through Becket, Middlefield and Chester, falling 840 feet before joining the Main Branch in Huntington 25 miles above its mouth. At the United States Geological Survey gage 1.5 miles upstream of its confluence, the West Branch has an average flow of 182 cfs and drains an area of 93.7 square miles.

Below Huntington the river flows over three dams in succession and the river slope decreases as it approaches the town of Westfield. The Westfield River is joined by the Little River 11 miles above its mouth, just as the river is reaching the floodplain of the Connecticut River. The river deepens and winds its way through Robinson State Park and over one more dam in West Springfield before it joins the Connecticut River. The average flow of the Westfield at its confluence with the Connecticut River is 930 cfs.

Water Quality Conditions and Trends

The Technical Services Branch conducted water quality surveys in the Westfield River Basin in 1985. Data collected during the surveys showed good water quality throughout most of the basin. Water quality was impaired in the lower, urban portion of the basin.

Water quality in the upper portion of the basin, the east, west, and middle branches of the Westfield River, was very good. Dissolved oxygen levels were high and pollutant concentrations were low. Water quality in the main stem Westfield from Huntington to the city of Westfield was also very good. Water quality was impaired in the river in the urban portion of the basin, where the river travels through Westfield, Agawam, and West Springfield. Bacteria con-

centrations were high at most of the sampling stations in this portion of the watershed. Nutrients and solids levels were somewhat elevated. These problems are caused primarily by combined sewer overflows (CSOs) in sewered areas and failing sub-surface systems in non-sewered areas. A major program to rehabilitate portions of the Westfield sewer system was recently completed. Problems in the Agawam sewer system is being studied as part of the lower Connecticut River CSO project.

Nonpoint sources of water pollution are not a significant source of pollution in the upper and middle portions of the Westfield River Basin. The lower portion of the watershed is predominantly urban. Nonpoint sources in this area include failing subsurface systems and urban runoff. The effect of the nonpoint sources is difficult to separate from the effect of CSOs, which are considered point sources of pollution.

REFERENCES

Massachusetts Division of Water Pollution Control. 1978. The Westfield River 1978 Water Quality Data - Wastewater Discharge Data, Westborough, Massachusetts. 113 pp.

_____. 1980. The Westfield River 1979 Water Quality Data - Wastewater Discharge Data. Westborough, Massachusetts. 63 pp.

_____. 1985. Westfield River 1985 Water Quality Data, Westborough, Massachusetts. 63 pp.

Figure 33 WESTFIELD RIVER BASIN (32)

TABLE 31
WESTFIELD RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
West Branch Westfield River						
Source in Becket to confluence with main stem Westfield River, Huntington	17.5-7.5 7.5-0.0	B/SCWF/AD B/SCWF	S	--	--	--
Middle Branch Westfield River						
Source in Peru to Littleville Dam, Huntington	18.1-1.0	A	S	--	--	--
Littleville Dam to confluence with main stem Westfield River, Huntington	1.0-0.0	B/SCWF/AD	S	--	--	--
Mainstem Westfield River						
Source in Savoy to confluence with West Branch, Huntington	62.5-25.1	B/CWF/AD	S	--	--	--
From confluence with West Branch to Rte. 202 bridge, Westfield	25.1-12.3	B/WWF	S	--	--	--

TABLE 31 (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Rte. 202 bridge to Agawam town line	12.3-7.8	B/WWF	PS	Fecal coliform bacteria	-CSOs -Failing on-site systems	-CSO abatement. -Better maintenance, or tie into sewer.
Agawam town line to confluence with Connecticut River, W. Springfield	7.8-0.0	B/WWF	NS	Fecal coliform bacteria	-CSOs -DWOs	-CSO abatement.
Little River						
From Horton's Bridge to confluence with Westfield River, Westfield	4.7-0.0	B/SCWF	NS	Fecal coliform bacteria	-Failing on-site systems -CSOs	-Better maintenance, or tie into sewer. -CSO abatement.
Powdermill Brook						
From confluence with Arm Brook to confluence with Westfield River, Westfield	3.2-0.0	B/SCWF/AD	S	--	--	--

Miles Assessed: 106.0 mi
Miles Supporting Classification: 89.0 mi
Miles Partially Supporting Classification: 3.5 mi

THE WEYMOUTH AND WEIR RIVER BASIN AND COASTAL DRAINAGE AREA (74)

Description of the Watershed

Teh Weymouth River Basin, as depicted in Figure 34 is located south of the city of Boston, nestled along the coast of eastern Massachusetts. The basin is comprised of many small creeks and streams with the Weymouth Fore and Back Rivers comprising the two main drainage systems which flow into Hingham Harbor. The Fore River is comprised of the Cochato, Monatiquot, and Fore Rivers with a total drainage area of 42.3 square miles. The Back River is comprised of the Mill River, Whitmans Pond, and the Back River with a total drainage area of 26.5 square miles. The Town River constitutes the northern portion of the basin while the Weir River makes up the southern boundary. The fresh water streams flow into the main tidal portions of the estuarine stream which flow into Hingham Harbor.

Water Quality Conditions and Trends

The water quality data for this basin is severely limited. The available data indicate that there is a serious dissolved oxygen and bacteria problem in much of the basin. It is assumed that these problems stem from runoff and discharge (exfiltration) from the sewer system in the communities of the basin. A rehabilitation/replacement program is being undertaken by the Massachusetts Water Resources Authority which will reduce the input of pollutants to the streams and eventually to Hingham Bay.

The Weymouth River Basin is impacted by typical urban nonpoint source inputs particularly bacterial contamination. The paucity of data does not allow for determination of the exact causes of the contamination; these problems should be identified through the newly formed Nonpoint Source Program, under the authority of the Division of Water Pollution Control.

REFERENCES

Metropolitan Area Planning Council. 1978. Areawide Waste Treatment Management Plan for the Metropolitan Boston Area. Volume II. Boston, Massachusetts. 402 pp.

Massachusetts Division of Water Pollution Control. 1982. The Weymouth River Basin 1982 Water Quality Survey Data. Westborough, Massachusetts. 27 pp.

Figure 34 WEYMOUTH AND WEIR RIVER BASIN (74)

TABLE 32
WEYMOUTH AND WEIR RIVER BASIN AND COASTAL DRAINAGE AREA

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE(S) OF PROBLEMS	ABATEMENT NEEDS TO MEET CLASSIFICATION
Weymouth Fore River Mary Lee Brook at Union St. to Mukusea St., Braintree	12.4-5.1	B/WWF/AD	NS	Dissolved oxygen Fecal coliform bacteria	-Runoff -Faulty sewer lines	-BMPs -Rehabilitation of sewers.
Weymouth Back River Whitmans Pond to Fresh River, Weymouth	6.1-3.2	B/WWF/AD	S	--	--	--
Town River Old Quincy Reservoir to Route 3+4A, Quincy	4.7-1.5	SB	NS	Fecal coliform bacteria	-Runoff -Faulty sewer lines	-BMPs -Rehabilitation of sewers.

Miles Assessed: 13.4 mi
Miles Supporting Classification: 2.9 mi
Miles Partially Supporting Classification: 0.0 mi

MASS. EA22.2:C73/988/app.4

COMMONWEALTH OF MASSACHUSETTS SUMMARY OF WATER QUALITY 1988

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Appendix IV - Non-point Source Assessment Report

Massachusetts Department of Environmental Quality Engineering
Kenneth Hagg, Acting Commissioner

DIVISION of WATER POLLUTION CONTROL
Thomas C. McMahon, Director

82/370

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INTRODUCTION

This report is intended to satisfy federal requirements for the 1988 305(b) report as well as for Section 319 of the Clean Water Act. In the latter case, the requirements are that the state shall provide the following four categories of information:

(A) navigable waters within the state which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain applicable water quality standards or the goals and requirements of the Act;

(B) categories and subcategories of nonpoint sources or, where appropriate, particular nonpoint sources which add significant pollution to each portion of the navigable waters identified under subparagraph (A) in amounts which contribute to such portion not meeting such water quality standards or such goals and requirements;

(C) the process, including intergovernmental coordination and public participation, for identifying best management practices and measures to control each category and subcategory of nonpoint sources and, where appropriate, particular nonpoint sources identified under subparagraph (B) and to reduce, to the maximum extent practicable, the level of polluction resulting from such category, subcategory, or source; and

(D) state and local programs for controlling pollution added from nonpoint sources to, and improving the quality of, each such portion of the navigable waters, including but not limited to those programs which will receive federal assistance under subsection (h) and (i).

All information presented has been "monitored" and confirmed unless indicated as "evaluated" or unconfirmed. Additional information submitted by the Nonpoint Source Advisory Committee and town Conservation Commissions is considered "evaluated" except shellfish bed closures. It is assumed coliform bacteria data is available from the Division of Marine Fisheries or DEQE regional offices. Extensive use of the 1986 305(b) report makes this report the most complete to date.

It should be noted that the main branchs of the state's rivers are monitored, not the tributaries, due to limited resources. Only about 5% of the state's lakes are assessed in this report. These lakes are known to have a problem and are referred to the Division of Water Pollution Control (DWPC) from local interest groups. While information on rivers and lakes is organized by basin, groundwater information as presented by the Divisions of Water Supply, Hazardous Waste, Solid Waste Management and Water Pollution Control is organized by town.

Nonpoint source pollution assessment of wetlands is not available at this time. The Division of Wetlands and Waterways enforces the Wetlands Protection Act, whose goal is to control manmade alterations to wetlands for flood control and protection of wildlife and fisheries habitat, water supply and groundwater. Assessment of wetlands for pollution impacts is not within their mandate. Local Conservation Commissions administer regulations within each town and forward appeals to the state. There is no assessment at the local level either.

Terms used in this report need to be defined. Appendix I contains a definition of the various water use classifications. "Support Status" can be either Support (S), Partial Support (PS) or Non-Support (NS). Support means the water body consistently meets all the criteria established for that water use classification. Partial Support means the waterbody partially meets the criteria while Non-Support means the waterbody consistently does not meet all the criteria. "Surface runoff" applies to overland flow that is not piped directly to a waterbody while storm drains applies to overland flow that is. It should be noted that the definition of "point source," as stated in 314 CMR 3.02 (34), indicates that boats and septic systems are point sources. These sources, however, will be addressed under the Nonpoint Source Program.

As outlined in the Nonpoint Source Program Workplan for 205(J)(5), issues relating to interstate waters will be addressed during the coming year. Such issues would include identification of interstate waters impacted by significant nonpoint source pollution, and establishing a timetable and order of priorities. Due to the volume of information received and the short time period available to produce this report, it is anticipated that an updated report will be published next year (1989), and thereafter each year the 305(b) report is due (1990, 1992, etc.).

The DWPC has evaluated urban runoff on two lakes under the Nationwide Urban Runoff Program. These studies identified heavy metals present in both Lake Quinsigamond and Mystic River due to urban runoff. Additional priority pollutants such as chlordane, PCB-1260, butyl benzyl phthalate, hydrocarbons were found in Lake Quinsigamond while diethyl phthalate and pyrene were found in the Mystic River. The long term goal of the Nonpoint Source Program is to expand this type of data base.

Nonpoint source pollution impacts on groundwater originate from a multitude of sources. Sources believed significant but not fully assessed include pesticide contamination from agricultual and household activities, careless disposal of solvents and waste oils from the automotive industry and households, nonsanitary wastes discharged to septic tanks from industry and households, highway runoff and road salt storage, improperly sited and malfunctioning septic tanks and household lawn fertilizer use. High radon areas are an additional concern.

Source information presented in this report includes a listing of Type III discharge permit areas (from the Division of Water Pollution Control), a listing of the sodium concentration in public water supplies, a listing of closed public water supplies (from the Division of Water Supply), and a printout of regional landfill information (from the Division of Solid Waste Management). In addition, the reader is referred to a Division of Hazardous Waste publication entitled "List of Confirmed Disposal Sites and Locations to be Investigated." This publication is too large to be included in this report and is published quarterly.

The reader is also referred to the 1984 Massachusetts Water Quality Standards, 314 CMR 4.00. High quality waters are listed under 314 CMR 4.04(2) and because of rapid land development in the state, they must all be considered threatened.

In conclusion the Nonpoint Source Assessment Report is intended to be a dynamic document continually changing as more information is obtained. There is a clear

need to assess nonpoint source impacts on wetlands and groundwater as well as highway runoff. Public participation and input is vital to this effort and will continue to be strongly encouraged. Further, as we focus our attention on nonpoint source pollution we may have to prioritize the various pollutants included in nonpoint source pollution. For example, an important issue is the extent of toxics in urban stormwater and what the public health risk of such toxics is. As the state of Massachusetts controls and manages the point sources affecting water quality, it appears that nonpoint sources will also have to be addressed in a meaningful way if we are to truly reach the goal of "fishable and swimmable" waters. As mentioned, this document should not be considered a static enterprise, but rather as a beginning step in a comprehensive, dynamic process of addressing and controlling nonpoint sources of water pollution.

MASSACHUSETTS NONPOINT SOURCE PROGRAM ASSESSMENT REPORT

PROCESS FOR IDENTIFYING BMP

The primary process used to identify best management practices will involve the Massachusetts Nonpoint Source Advisory Committee. This committee is currently comprised of 41 members representing federal, state, regional and local interests (list attached). The committee has met several times and is beginning work on the nonpoint source management plan. The Division feels the committee is a balanced group representing water quality interests on a statewide basis.

Staff of the Division of Water Pollution Control's Nonpoint Source Program will prepare much of the groundwork identifying and describing best management practices and the appropriate nonpoint source controls. An example of this type of work is the primer on nonpoint source pollution ("Nonpoint Source Pollution - An Outline of Basic Information, July 1987") developed by the Division.

Once the Division and Advisory Committee have completed a draft management plan relative to best management practices, plans are to expand the review process on a broader scale to include all appropriate agencies and public organizations that have direct interests or expertise in water quality issues as they relate to nonpoint sources of pollution.

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MASSACHUSETTS NONPOINT SOURCE PROGRAM ASSESSMENT REPORT

IDENTIFICATION OF NPS PROGRAM

Attached is an overview of nonpoint source management in Massachusetts. This overview has been reviewed by the Advisory Committee and many of their comments have been incorporated. The Division feels this is a good first effort at fully describing all of the programs (regulatory and nonregulatory) which address, directly or indirectly, nonpoint sources of pollution. The overview covers federal, state, regional and local programs. This overview will be reviewed and expanded as more information becomes available.

At this time it is difficult to state with any certainty which programs may be targeted to receive assistance under 319(h) or 319(i). Priorities mentioned in 319(h)(5) will be kept in mind as the management plan is developed. One area financial assistance will help support the NPS Program is with technical assistance, education and perhaps training. Comment from the Advisory Committee indicates a real need for assistance in this area. Consideration may be given to cooperating with conservation districts, regional planning agencies and the like on providing assistance which will foster nonpoint source controls at the local level through education, technical assistance, and/or training. This process would likely involve the submission of proposals to the Division with definitive action programs.

The important thing to keep in mind is that there already exists a framework of organizations that are quite capable of implementing nonpoint source control strategies. It is our intent to work with those various entities identified in the overview to implement the nonpoint source management plan. The Division would provide oversight and accountability for such assistance and work closely with such groups to ensure a maximum efficiency and cost-effectiveness in implementing best management practices and related nonpoint source control strategies.

Because of the limitations on the use of funds imposed by 319(h)(7) it is expected that any implementation of actual BMPs or construction related projects will be eligible only if they meet EPA's criteria for demonstration projects. The Division is working with the state legislature on establishing a state nonpoint source program which hopefully will provide funds for the actual implementation of BMPs. It is emphasized that whatever assistance the state may receive under 319(h) or 319(i) will be used toward the goal of implementing the Nonpoint Source Management Plan. Clearly, emphasis must be placed upon an attitude of implementation as distinguished from a "planning effort." Those programs which may receive assistance must be directed toward improving water quality. It is felt this is the real bottom line and the intent and purpose of the federal nonpoint program. The primary goal shall require that the crucial element of water quality improvement be given primary consideration in the process.

NONPOINT SOURCE MANAGEMENT IN MASSACHUSETTS
AN OVERVIEW

Eben Chesebrough
May 1987
Revised August, 1987

I. INTRODUCTION

This paper summarizes nonpoint source management programs in Massachusetts in regard to who's doing what and where. By its very nature nonpoint source management involves a diversity of agencies at the federal, state and local level. Before Massachusetts embarks upon a state-wide program, a logical first-step should include a survey of agency responsibility in the area of nonpoint source pollution.

The impetus for this effort includes the new federal section 319 Nonpoint Source Management Program of the Clean Water Act passed by the 100th Congress on February 4, 1987. Other reasons for initiating this effort include recent attention given to water quality problems associated with storm water runoff, sludge deposits in certain waterways (e.g., Assabet River, French River), closure of shellfish areas, and similar issues including interstate problems such as phosphorus in the Housatonic River.

The literature concerning nonpoint source pollution and its control is extensive. Recent attempts have also been made to delineate agency responsibilities for nonpoint source pollution and the following is a synopsis of some of those attempts. A listing of these reports can be found at the end of this paper.

II. FEDERAL PROGRAMS

A. United States Department of Agriculture (USDA) [NOTE: the following USDA discussion is from "Mass. Agricultural Water Quality Study," 1984.]

1. Conservation Operations. In Massachusetts, the Soil Conservation Service (SCS) works through 16 conservation districts which are subdivisions of state government. Landowners and users can become district cooperators and receive technical assistance in planning and applying nonpoint source control measures to their land. Most conservation (nonpoint source control) measures have water quality benefits but certain measures such as Waste Management Systems, or Livestock Exclusion, can have major impacts on improving downstream water quality.

2. Watershed Protection and Flood Prevention Act (Public Law 83-566). The SCS administers this watershed program which provides federal technical and financial assistance to states, communities, conservation districts, and others in solving land and water problems. Three purposes of importance to nonpoint source control are as follows:

    1. Watershed protection which is the protection of watershed areas by reducing erosion, sediment, and runoff through the establishment of land management techniques.

2. Conservation and proper utilization of land which includes control of agriculture-related pollution through the application of conservation practices. Animal waste, agricultural chemicals, and pesticide runoff problems can be reduced under this purpose.

3. Agricultural Water Management which includes conservation, development, utilization, and disposal of water.

In this program a plan is developed for a watershed area, not to exceed 250,000 acres in size, to solve the identified problems. When a plan has been approved federal cost-sharing can be provided up to a limit of $100,000 to any one landowner or operator.

3. Resource Conservation and Development Program. There are two Resource Conservation and Development Areas (RC&D) in Massachusetts: the Berkshire-Pioneer RC&D Area which covers Berkshire, Hampden, Hampshire, and Franklin Counties, and the Pilgrim RC&D Area which includes Bristol, Plymouth, Barnstable, Dukes, and Nantucket Counties. Under this program where there is an authorized project area, measures similar to those described above under the Watershed Protection and Flood Prevention Act can be carried out. Usually these measures are smaller and less complex than those under the Watershed Protection and Flood Prevention Act. Assistance for installation of conservation measures under the RC&D program will be authorized only if offsite problems are solved. The SCS administers this program for USDA.

4. Agricultural Conservation Program. The Agricultural Stabilization and Conservation Service (ASCS) administers this program for USDA. Under this program cost-sharing funds are provided to farmers and other landowners who undertake soil and water, forest and wildlife conservation practices. Distribution of these funds is handled by county ASCS committees. Technical assistance on practices is furnished by the SCS, Extension Service, U.S. Forest Service, and the Massachusetts Division of Forests and Parks. Solving conservation and pollution problems relative to nonpoint source management is a major priority for this program.

5. Rural Clean Water Program. This is an experimental program administered for USDA by the ASCS. The purpose of this program is to reduce agricultural pollution of the nation's water resources. The program provides federal cost-sharing and technical assistance to encourage farmers to voluntarily perform Best Management Practices to control agricultural pollution. In Massachusetts only the Westport River is in this program. Up to $50,000 federal cost-sharing can be apportioned to an individual farm operation.

6. Agricultural Stabilization and Conservation Service Special Projects. Along with the above programs, ASCS also designates areas with agricultural related pollution problems as Special Projects. In designated Special Projects additional federal cost-sharing above the level of

Agricultural Conservation Program (ACP) funding can be made available for conservation and agricultural pollution control measures. The yearly maximum cost-sharing amount per farm for ACP of $3500 applies to these Special Projects.

7. Federal Food Security Act of 1985 (P.L. 99-198) also known as the Farm Bill of 1985. This law contained two historic provisions that, for the first time, linked USDA program benefits to USDA conservation programs: the Highly Erodible Land Conservation provision ("sodbuster" provision) and the Wetlands Conservation provision ("swampbuster" provision).

   Under the sodbuster provision, a farmer who plants an agricultural commodity on highly erodible land that was not cropped during one of five years prior to December 23, 1985, will lose eligibility during that crop year for certain USDA farm program benefits unless the highly erodible is cropped according to a conservation plan approved by the local conservation district and Soil Conservation Service.

   Under the swampbuster provision, farmers who produce an agricultural commodity on wetlands converted for such production after December 23, 1985, lose eligibility for USDA farm program benfits. The swampbuster rule does not apply if the farmer can show that conversion of the wetland was commenced prior to December 23, 1985; or, that conversion of the wetland has minimal effect on wetland values; or, if production is possible as a result of natural conditions (e.g., drought) and the farmer does not alter the natural water regime of the wetland.

   Farmers who apply for USDA program benefits are required to certify that they are not in violation of these programs. Further, farmers who are in violation of the Farm Bill conservation provisions will be ineligible for USDA farm program benefits for any crop that is produced on any land they own or operate.

B. United States Environmental Protection Agency

   1. Nonpoint Source Management Program.

      Created as section 319 of the Clean Water Act (P.L. 92-500) by Congress in 1987. *This program establishes a comprehensive approach to managing nonpoint sources of pollution. Congress included this national program in the 1987 amendments to the Clean Water Act because it was felt that such an effort was required in order for the nations waters to meet the goals and requirements of the Clean Water Act.

      In addition to providing a financial incentive, §319 of the federal act imposes several requirements on the state, which must be complied with whether funding is sought or not. The first of these is preparation of a report identifying:

      °which waters are unlikely to attain or maintain water quality standards without nonpoint control,

- °the categories and subcategories of nonpoint sources (or even particular sources) which cause the problems,
- °the process (including public participation) for identifying best management practices or other measures to control pollution from each identified category, subcategory, or individual source, and
- °state and local programs to control nonpoint pollution.

The report is due by July, 1988. If the state does not submit an adequate plan (there are provisions for EPA review and approval, and correction of deficiencies), EPA is directed to prepare the plan.

Secondly, a management program proposing implementation over the ensuing four fiscal years must also be submitted by July, 1988, outlining the specific measures the state will take to control nonpoint pollution, including specific milestone schedules. The act provides federal grants to the states for the purposes of implementing the plan, in addition to §205(j) funds, of up to 60% of the cost of the state program. The state may use federal funds for financial assistance to individuals (as either grants or loans) only to the extent that the assistance is related to the costs of demonstration costs. States may also use the 201(g) set aside discretionary funds for nonpoint source controls. There are numerous other procedural requirements and financial limitations that are not necessary for the purposes of this paper, but will be necessary should the state decide to seek funding. One option explicitly authorized by the act is to allow local public agencies to develop and implement the management plans, thereby receiving the federal grants instead of the state. Because the management plan must be developed in cooperation with local agencies and organizations that have expertise in this area, this option should be given careful consideration. [NOTE: This discussion on Section 319 has been taken from a memo by Dean Spencer, DEQE Legal Section].

When the state prepares the Nonpoint Management Program, substate public entities may be designated as the authorities responsible for specific control activities, such as watershed or aquifer protection, housing density control, land management measures and sanitary code enforcement.

2. National Pollutant Discharge Elimination System (NPDES)

Although traditionally associated with point source discharges, the NPDES is heading in the direction of stormwater control. The 1987 amendments to the Clean Water Act amended Section 402 by adding a municipal and industrial stormwater discharge subsection. This new subsection will require certain significant stormwater discharges to have permits by 1991. By October, 1992 the EPA must have in place a plan for dealing with all stormwater discharges in such way as to protect the receiving waters. By adding this subsection it is clear that Congress appreciated the magnitude of the nonpoint source problem associated with stormwater discharges.

3. State Revolving Fund-Title VI.

Title VI of the new act authorizes a state revolving loan fund, capitalized in part through federal grants to the states for this purpose. Although this section of the act was intended primarily as the replacement for the federal construction grants program, it is important to note that loans for implementation of nonpoint projects are also authorized by Title VI. Thus, while federal grant funds for implementation of nonpoint projects are not provided by the act, the act does create the same mechanism for assisting such projects that will be used (from the federal standpoint, at least) for treatment plant projects.

The labyrinth of Title VI requirements is beyond the scope of this memorandum, but it is worth noting that:

- °there is a state match requirement for creating the fund,
- °there are several restrictions on the use of the federal and the state matching share of the fund, such that many states are actively exploring the desirability of establishing separate but related funds (perhaps different accounts within the same program),
- °projects that will ensure progress toward the "enforceable goals, requirements, and schedules of the act," including the municipal compliance deadline for secondary treatment, receive priority under the federal rules.

Thus, after 1991 the federal program will treat nonpoint projects in essentially the same manner, albeit with a somewhat lower priority, as treatment works projects. On the assumption that Massachusetts will be seeking the capitalization grants to establish one or more revolving loan funds, it will be necessary to consider the potential impact of this program on any nonpoint program, and vice-versa. [NOTE: This discussion on Title VI has been taken from a memo by Dean Spencer, DEQE Legal Section].

4. Clean Lakes. Section 314 of The Clean Water Act created a national Clean Lakes Program, under which the Environmental Protection Agency, (EPA) may provide financial assistance to States to implement methods and procedures to protect and restore publicly owned freshwater lakes.

In Massachusetts this program has addressed pollution sources which generally are classified as nonpoint in origin, especially sources of phosphorus, nitrogen, sediment and fecal coliform. Thus many of the federal Clean Lakes Program projects in this state have involved the application and implementation of best management practices to control nonpoint sources of pollution.

5. Pesticide Program.

At the national level, EPA is responsible for the administration of federal pesticide control legislation (Federal Insecticide, Fungicide and Rodenticide Act). A key function of EPA in this area is the regulation and control of pesticides for use nationwide.

Massachusetts Cooperative Extension assists farmers and others with information on pesticide use including which pesticides to use and when, application rates, and other information necessary for proper pesticide use.

Recently, pesticide contamination of ground water has surfaced as one of the major nonpoint source water quality issues in the state. Monitoring for pesticides had been concentrated on surface waters in Massachusetts. Until recently, little monitoring of groundwater for pesticides had been done in the state. Now that recent monitoring of both private and public groundwater supplies has indicated pesticide contamination of many of these supplies many questions have arisen. Information is needed about which pesticides were used, the quantity used, the amounts which may still be in the local environment and other such questions about these pesticides. In addition, much information is needed about the specific groundwater aquifers affected and the transport mechanisms of pesticides and other contaminants from the site of application to and through these aquifers. This may become a prime nonpoint source issue in these areas of Massachusetts where intensive agriculture still takes place, such as the Connecticut River Valley.

C. United States Corps of Engineers (COE)

1. Rivers and Harbors Act

Through this federal regulatory program the Corps regulates construction activity in or over navigable waters of the United States. Activities could include construction of piers, boat launches, jetties or berms, and dredging. A permit must be obtained to conduct any construction activity below the mean high water mark.

2. Section 404-Clean Water Act

Under this regulatory program the Corps oversees the disposal of dredge and fill material to all waters of the nation including wetlands. Dredge and fill activities may include site development for recreation, industry or residences; property protection or reclamation such as installation of riprap, seawalls or gabions; and fill associated with the creation of ponds. A permit is required to conduct any of these dredge and fill activities whether the work is temporary or permanent.

III. State Programs

A. Executive Office of Environmental Affairs (EOEA)

1. Massachusetts Environmental Policy Act (MEPA) Program.

By law, all agencies, departments, boards, commissions and authorities of the Commonwealth must prepare, circulate and consider an

Environmental Impact Report (EIR) 60 days prior to undertaking any project "which may cause damage to the environment," including to a limited extent licenses and permits to private projects. Regulations define which projects are subject to MEPA review. Very small projects may be exempt, but large projects, or projects in sensitive areas, are likely to trigger MEPA. The MEPA process begins with an Environmental Notification Form (ENF) which is widely distributed for review and comment. If the MEPA regulations require it or the ENF review process substantiates it, then a formal Environmental Impact Report (EIR) will be necessary. This review process affords ample opportunity for reviewers to comment upon and recommend the inclusion of certain non-point best management practices to protect water quality.

2. Massachusetts Coastal Zone Management (CZM) Program.

The Coastal Zone Management Program relies extensively on existing authorities to achieve its objective - that is, the state has chosen to "network" existing permit, grant and management programs of the state to achieve specific CZM policies adopted in Executive Office of Environmental Affairs regulations. Perhaps the major purpose here is to plan land use wisely so as to preserve, protect and manage the coastal zone with minimal adverse environmental impact. Nonpoint source pollution control can certainly be considered one of the goals of the program as it affects coastal waters. Activities which may be included are dredging and dredge disposal, erosion problems from construction, expansion of the coastal wetland restriction program, identification of areas of critical environmental concern, and generally ensure that the environmental and economic value of the coastal zone will be sustained and enhanced.

The CZM conducts a formal review required by the Federal Coastal Zone Management Act of all coastal projects requiring a federal license or permit, implemented by a federal agency, or carried out with federal funds. The CZM also reviews and comments on all coastal activities that are under formal review by MEPA. A formal review of all coastal discharge permits under the National Permit Discharge Elimination System (NPDES) is required of CZM, for example.

3. Massachusetts Self-help Program.

Since the adoption of M.G.L. Chapter 132 A, section 11, which established the Massachusetts Self-Help Program The Commonwealth (through its Division of Conservation Services) has pioneered in sharing with municipalities the cost of acquiring conservation land. Through this program, local conservation commissions can obtain up to 80% of the cost of acquiring land for conservation, open space and passive outdoor recreation purposes. Lands acquired include floodplains, inland and coastal wetlands, lake and ocean beaches, forest lands and unique natural areas. Like many of the other state land acquisition programs, this one may be viewed as a means of non-point source control.

B. Department of Environmental Quality Engineering (DEQE)

1. Clean Lakes Program. Established in 1981, the Massachusetts Clean Lakes Program provides up to 3 million dollars per year, to study and implement methods for lake restoration and preservation. To a large degree the State Clean Lakes Program involves implementation of best management practice for nonpoint source control within lake watershed. This program is administered by The Division of Water Pollution Control within the DEQE.

2. Aquifer Protection Program. The Division of Water Supply within the DEQE administers a program called the Aquifer Land Acquisition Program. The purpose of this program is to provide funding to communities to purchase property on aquifers of existing public water supplies to protect the water supply from potential pollution. By buying and protecting such land the program may be considered as a nonpoint source pollution control program.

C. Department of Environmental Management (DEM)

1. Watershed Protection and Flood Prevention Act Program (Public Law 83-566)

This cooperative State/Federal program provides technical and financial assistance to communities and landowners in solving land and water problems. The Division of Water Resources is responsible for administering these projects for the Commonwealth and, the U.S. Soil Conservation Service does the same for the federal government. The Division, with annual budget allocations, is responsible for annual maintenance of the flood control structures and adjacent land on 23 project reservoir sites. Seven PL-566 projects have been completed, five are under construction and, one project is in the planning stage. Three goals of these projects are of importance to nonpoint source control:

a. Watershed protection, which is the protection of watershed areas by reducing erosion, sediment, and runoff through the establishment of land management techniques.

b. Conservation and proper utilization of land, which includes control of agriculture-related pollution through the application of conservation practices. Animal waste, agricultural chemicals, and pesticide runoff problems can be reduced under this goal.

c. Agricultural Water Management which includes conservation, development, utilization, and disposal of water.

In this program a plan is developed for a watershed area, not to exceed 250,000 acres in size, to solve the identified problems. Finally, an important feature incorporated into the design of project impoundment sites are the sediment pools which act to reduce the sediment loads in the headwater streams where they are located.

Floodplain Management Studies Program

These are also joint DWR/SCS (U.S. Soil Conservation Service) studies, authorized by Section 6 of Public Law 83-566. It provides needed information to communities where flood damage is a serious concern and local governments want to take action to reduce these damages; thus, these studies are site specific and of a problem-solving nature. Recommended solutions act to reduce flooding which also reduces the runoff of non-point pollutants to the rivers and streams.

2. Rivers and Harbors Program. This program, generally funded through state capital outlay budgets, is designed to renovate and improve the waterways of the Commonwealth. Many of the funded projects address the control of nonpoint source pollution such as erosion control, stream bank stabilization, sedimentation control and reduction, flood damage repair and other conservation-type projects.

3. Scenic Rivers Program. This program provides financial resources to eligible communities to acquire so-called "greenways" along rivers and streams to provide open space and protection of the waterways from developmental pressure. The establishment of such greenways may be viewed as a nonpoint source management strategy. At the current time this program is unfunded.

4. Bay Circuit Program. This program focuses on the area between Routes 128 (I 95) and Interstate 495 and encompasses fifty communities. Nonpoint source control related activities of this program include the possible acquisition of property for greenways and open space.

5. North River Commission. This localized program is funded by DEM and has as one of its major purposes protection of the river from pollution, including nonpoint source pollution. This program is currently in the study phase.

6. Connecticut River Action Program. This localized program involves conservation and protection of the Connecticut River watershed area, including the agricultural land. The overall impact of the program may be considered as contributing to nonpoint source pollution control of the river.

7. Massachusetts Forest Cutting Practices Act (M.G.L. Chapter 132, Section 40-46)

This act, administered by the Division of Forests and Parks in DEM, regulates the harvesting practices for wood products on the state's forestlands. The act addresses the issue of nonpoint source pollutants resulting from wood harvesting practices and their impact on water resources, including wetlands.

8. Ocean Sanctuaries Program (M.G.L. Chapter 132A, Sections 13 and 16-18)

The entire Massachusetts coast, except for the shoreline between Lynn and Marshfield, is either in or abutting on Ocean Sancutary. The Ocean

Sanctuaries Act prohibits certain activities that would seriously alter or endanger the ecology or appearance of the ocean. The Division of Water Resources within the DEM is the chief agency overseeing the Ocean Sanctuaries Program.

9. Early Aquisition of Reservoir Sites Program

The Division of Water Resources within the DEM is authorized to acquire land, water or easements to protect future water resource values and conserve impoundment sites for the purpose of flood control, low flow augmentation and/or municipal water supply. Previous acquisitions have augmented the public water supplies serving Newburyport, Salem, Beverly, Abington, Rockland and sections of Hanson, Pembroke, Norwell, and Hingham. This state acquired land is turned over to the local communities where its watershed is afforded enhanced local protection which reduces the erosion of sediment and other polluting substances into the waterbodies.

10. In General. The Division of Forests and Parks manages some 250,000 acres of land in the Commonwealth as state forests and parks. This management includes many nonpoint source best management practices to conserve and protect the state's natural resources. Much of their effort includes the maintenance of various waterbodies such as the nonpoint source controls being implemented at Walden Pond in Concord (i.e.,shore stabilization and erosion control).

D. Department of Food and Agriculture (DFA)

1. Agriculture Preservation and Restriction Program.

This program, which falls under the general category of conservation restrictions, is designed to help stem the loss of agricultural land, in Massachusetts.

Upon successful nomination and application by the local Conservation Commission, the DFA essentially buys the development rights of farm land from the owner, provided that the land remains in farming or forest use. This may be viewed as a means of controlling nonpoint source pollution by preventing development, although agricultural practices themselves may negate this premise.

2. Pesticides Program. Regulation of pesticides is carried out by the Pesticide Bureau of DFA. One of their key functions includes administration of the Massachusetts Pesticide Control Act which regulates the sale, distribution, use storage and disposal of pesticides. They set policies and promulgate regulations for certifying applicators, including persons applying pesticides on their own land. Nonpoint source pollution from pesticides can be a serious problem and this program may be considered a mechanism of implementing and enforcing best management practices for pesticide use and control.

E. Department of Fisheries, Wildlife and Environmental Law Enforcement (DFW)

1. Land Acquisition Program. The Division of Fisheries and Wildlife manage about 60,000 acres as wildlife preserves which they acquire from landowners through a capital outlay budget and a portion of hunting license fees. Much of this land abuts various waterways throughout the state and is open to the public for hunting fishing and general enjoyment. As long as funds are available the Division continues to acquire property. Because such property will remain in its wild and natural state this program may be considered as a nonpoint source control, especially when those parcels and tracts of wildlife property abut waterways.

2. Riverways Program

Under this program the Department provides grants to the most effective river and environmental protection organizations in the state to study, analyze, draft water quality profiles and map and locate all landowners along the major rivers and their tributaries. These riverway plans serve as a guide for watershed associations to monitor and advocate the proper operation and timely upgrading of wastewater treatment plants and the abatement of nonpoint pollution from such activities as agriculture and stormwater runoff.

F. Joint Government Venture

1. Agricultural Composting Program

This new initiative to manage agricultural manure in an environmentally and economically acceptable manner is shared by the State Department of Food and Agriculture, the State Department of Environmental Quality Engineering, the UMass Extension Service, the Massachusetts Farm Bureau Federation and the Federal Soil Conservation Service. The basic purpose is to mix agricultural waste with other material (e.g., leaves) to make compost in a cost effective manner. Although the issue of nonpoint source pollution was not a primary inspiration for this program, it certainly appears to be a welcome side effect.

IV. REGIONAL PROGRAMS

A. Massachusetts Soil and Water Conservation Districts

There are sixteen conservation districts in the state that have been active in improving the environment through basic conservation work on private lands. Although conservation districts have traditionally worked mainly with farmers they have recently extended their programs and services to other landowners. Counties, towns, suburbs, and businesses now cooperate with districts just as rural landowners do. A great deal of what the conservation districts do, involve conservation of natural resources which in practical terms often translates into best management practices for nonpoint source pollution control. The purpose of the districts is to focus attention on land, water and related

resource problems, to develop programs to solve them, and to enlist and coordinate help from all public and private sources that can contribute to accomplishing the district's goals. The U.S. Soil Conservation District (U.S.D.A.) works closely with the state conservation districts.

B. Massachusetts Regional Planning Agencies

There are thirteen designated regional planning agencies in the state. These planning agencies assist their host communities with planning problems and generally work toward implementing regional planning strategies that are in the best interests of the member communities. Under the Clean Water Act (P.L. 92-500) Section 208, the planning agencies were given the task of developing area-wide waste treatment management plans which included and emphasized nonpoint source management. These plans still exist and for the most part remain viable and ready for implementation.

C. Massachusetts Watershed Associations

For many of the major rivers in the state there exists a watershed association. Their goals and objectives vary somewhat, but are generally centered about land and water conservation, protection or restoration of water quality, expansion of recreational opportunities, and citizen participation in governmental programs affecting water and water quality. Nonpoint source management is included in their overall strategies.

D. Other Regional Organizations

There are many other regional organizations, such as the Massachusetts Congress of Lake and Pond Associations, whose goals include the protection and restoration of water quality through nonpoint source control. These organizations generally depend upon membership education to accomplish their purposes.

V. LOCAL PROGRAMS

A. Conservation Commissions

The local conservation commission appears to be the preeminent local authority for instituting best management practices for nonpoint source pollution control. Most of this authority comes from the Wetlands Protection Act (M.G.L. Chapter 131, Section 40). The work covered by the Wetlands Protection Act is virtually any development activity, including site preparation, which may alter a wetland. Local commissions can also adopt their own wetlands protection bylaw, which can give them additional leverage to protect water quality.

Actually, the State of Massachusetts invented the Local Conservation Commission. The Conservation Commission Act of 1957 included specifically the promotion and development of natural resources and the protection of the watershed resources of the state.

B. Planning Boards and Boards of Health

A second local authority with certain ways and means of implementing best management practices and sound planning is the Planning Board. Through zoning bylaws, the State Zoning Act and rules and regulations of the Planning Board a variety of protective measures can be invoked to diminish and control the negative impacts of subdivision growth multi-family housing projects and other major land developments. Boards of Health also have certain authority to review proposed subdivision plans in terms of drainage and sanitary conditions and approve or disapprove the plans or parts thereof. A Planning Board and/or Board of Health may adopt regulations which incorporate a local "MEPA" type of environmental review. Such local control, when implemented before and during the development, often produces the most efficient and cost effective nonpoint source management.

C. Local Earth Removal Control

A third local authority which certainly has relevance to BMPs and erosion control concerns the local earth removal control granted to cities and towns under M.G.L., Chapter 40, Section 21, Clause 17. Under this authority, anyone wishing to remove earth, sand, gravel, etc., must first receive a permit. The permit may stipulate certain conditions to control dust erosion, runoff of sediment, reclamation of the site, etc., in order to protect the environment from such mining activities.

VI. CONCLUSION

There are many programs on the federal, state and local level which address nonpoint source pollution either directly or indirectly. The case can be made, however, that no single program has a clear mandate to manage and coordinate nonpoint source management in the Commonwealth.

A Select Listing of Nonpoint Source Reports

Association of State and Interstate Water Pollution Control Administrators. 1985. America's Clean Water: The States' Nonpoint Source Management Experience. ASIWPCA, Washington, D.C. 20001.

Journal of Soil and Water Conservation. 1985. Nonpoint Water Pollution, A Special Issue. Volume 40, Number 1.

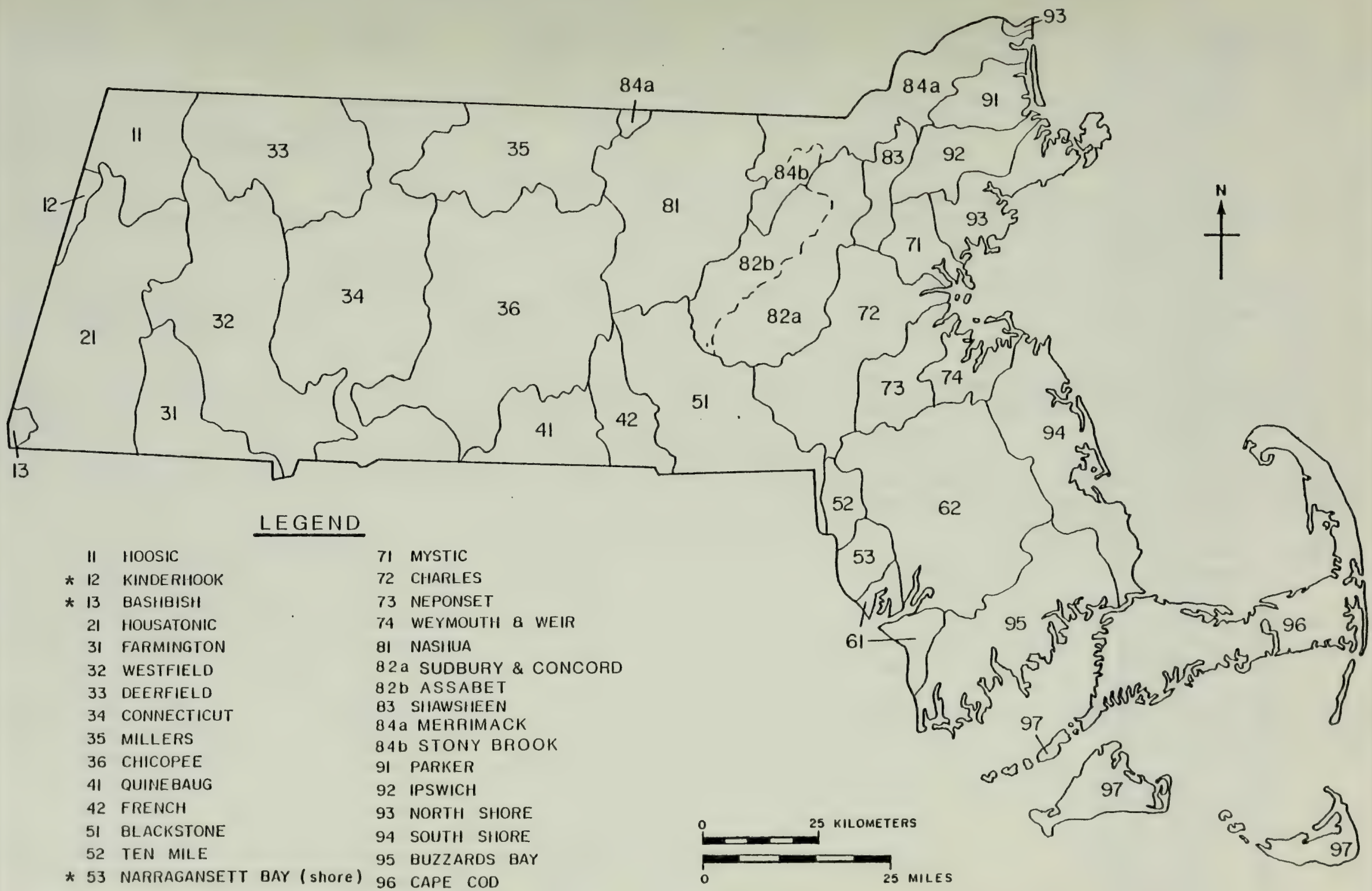
U.S. Environmental Protection Agency. 1984. Report to Congress: Nonpoint Source Pollution in the U.S. Water Planning Division, Washington, D.C. 20460.

U.S. Environmental Protection Agency. 1985. Federal/State/Local Nonpoint Source Task Force and Recommended National Nonpoint Source Policy. Washington, D.C. 20460.

U.S. General Accounting Office. 1986. The Nation's Water: Key Unanswered Questions About the Quality of Rivers and Streams. U.S. General Accounting Office, Washington, D.C., GAO/PEMD-86-6.

U.S. Soil Conservation Service, U.S. Economic Research Service, U.S. Forest Service and Massachusetts Water Resources Commission. 1984. Massachusetts Agricultural Water Quality Study. U.S. Department of Agriculture, Washington, D.C. 20460.

Figure 1 RIVER BASINS and COASTAL DRAINAGE AREAS



LEGEND

	11 HOOSIC	71 MYSTIC
*	12 KINDERHOOK	72 CHARLES
*	13 BASHBISH	73 NEPONSET
	21 HOUSATONIC	74 WEYMOUTH & WEIR
	31 FARMINGTON	81 NASHUA
	32 WESTFIELD	82a SUDBURY & CONCORD
	33 DEERFIELD	82b ASSABET
	34 CONNECTICUT	83 SHAWSHEEN
	35 MILLERS	84a MERRIMACK
	36 CHICOPEE	84b STONY BROOK
	41 QUINEBAUG	91 PARKER
	42 FRENCH	92 IPSWICH
	51 BLACKSTONE	93 NORTH SHORE
	52 TEN MILE	94 SOUTH SHORE
*	53 NARRAGANSETT BAY (shore)	95 BUZZARDS BAY
	61 MOUNT HOPE BAY (shore)	96 CAPE COD
	62 TAUNTON	97 ISLANDS

* No information presented in this report.

ASSABET RIVER BASIN

Nonpoint Source Conditions

Nonpoint sources of pollutant loadings to the Assabet River include in-place sediments, urban or storm runoff and septic system failures. The in-place sediments are of particular interest in the upper Assabet up to the town of Marlborough, and in the Acton/Maynard area, but heavy sediment deposits are actually present throughout most of the river. These sediments can create an oxygen demand, and absorb and release nutrients and metals.

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Outlet of Augmentation Pond, Westborough to Westborough WWTP, Westborough	31.0-30.0	B	PS	Fecal coliform bacteria	Surface runoff
Westborough WWTP outfall to Route 20 dam, Northborough	30.0-26.5	B	NS	D.O., Fecal coliform bacteria, Nutrients	Sediments, Storm runoff, Surface runoff
Route 20 dam to Marlborough Westerly WWTP, Marlborough	26.5-24.2	B	PS	D.O., Nutrients	Point sources, Sediments, Surface runoff
Marlborough Westerly WWTP to Hudson WWTP, Hudson	24.2-16.3	B	NS	D.O., Fecal coliform bacteria, Nutrients Nickel	Point sources, Sediments, Surface runoff
Hudson WWTP to outlet of Boons Pond, Stow	16.3-12.3	B	PS	D.O., Fecal coliform bacteria, Nutrients	Surface runoff, Storm sewers, Sediments
Outlet of Boons Pond to Maynard WWTP, Maynard	12.3-6.5	B	PS	Fecal coliform bacteria, Nutrients	Surface runoff, Storm sewers
Maynard WWTP to Concord MCI WWTP, Concord	6.5-2.5	B	PS	D.O., Fecal coliform bacteria, Nutrients Lead, Mercury	Septic system, Surface runoff, Sediments Storm sewers
Concord MCI WWTP to confluence with Sudbury River, Concord	2.5-0.0	B	PS	Nutrients, Lead, Mercury	Septic Systems, Surface runoff, Storm Sewers

Miles Assessed: 31.0
Miles Supporting Classification: 0.0
Miles Partially Supporting Classification: 11.4

BLACKSTONE RIVER BASIN

Nonpoint Source Conditions

Urban runoff, sediments and septic system failures in the impoundments comprise the main nonpoint sources of pollution within the Blackstone River Basin.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Dorothy Pond, Millbury	148	Surface runoff Septic systems Leachate
Flint Pond, Grafton	297	Surface runoff Septic systems
Indian Lake, Worcester	190	Surface runoff
North Pond, Hopkinton	239	Surface runoff Septic systems
Patch Reservoir, Worcester	31	Surface runoff
Lake Quinsigamond, Worcester	475	Surface runoff
Lake Ripple, Grafton	63	Surface runoff
Salisbury Pond, Worcester	15	Surface runoff
Singletary Pond, Millbury	330	Surface runoff Septic systems

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Kettle Brook from Waite Pond, Leicester to Curtis Pond, Worcester	59.3-51.3	B	NS	Coliform bacteria Nutrients	Septic systems
Middle River Curtis Pond to American Steel Dam, Worcester	51.3-48.8	B	PS	Solids, Coliform bacteria	Surface runoff Storm sewers
American Steel Dam, Worcester, to Fisherville Dam, Grafton	48.8-39.8	B	NS	Dissolved oxygen Solids, Coliform bacteria, Nutrients	Point sources
Fisherville Dam, Grafton to Rice City Pond, Uxbridge	39.8-31.1	B	NS	Dissolved oxygen Nutrients, Algae	Point sources
Rice City Pond, Uxbridge to Water Quality Monitor, Millville	31.1-23.7	B	S	--	Sediment in impoundments
Water Quality Monitor, Millville to Blackstone - Woonsocket, R.I.	23.7-20.0	B	PS	Coliform bacteria Nutrients	Surface runoff
Mumford River entire length	14.5-0.0	B	S	--	--
West River entire length	8.8-0.0	B	S	--	--

BLACKSTONE RIVER BASIN (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Mill River entire length	11.0-0.0	B	PS	--	Point sources, Surface runoff, Storm sewers
Mill Brook entire length	3.0-0.0	B	NS	Dissolved oxygen Solids, Coliform bacteria pH, Nutrients	Point sources
Beaver Brook, entire length	3.0-0.0	B	NS	Dissolved oxygen Solids, Coliform bacteria Nutrients	Urban runoff
Quinsigamond River, entire length	5.3-0.0	B	S	Sedimentation of the northern end of Lake Quinsigamond	Surface runoff

Miles Assessed: 84.9 miles
Miles Supporting Classification: 36 miles
Miles Partially Supporting Classification: 17.2 miles

Nonpoint Source Conditions

Boston Harbor is encompassed by the coastlines of the Mystic, Charles, Neponset, Weymouth and Weir River Basins. Nonpoint sources of pollution to Boston Harbor include numerous small untreated storm drains (with suspected illegal sewer tie-ins), urban runoff, oil spills, dredging, dumping, atmospheric deposition, ship and boat bilges, and other vessel wastes. Vessel impacts include anti-fouling paints used to prevent growth on ship hulls. Unfortunately, these paints work too well and impact marine life beyond intended areas. Copper, lead, mercury, zinc, arsenic, PCB's, and various organic compounds can be found in bottom sediment due to vessel traffic.

BOSTON HARBOR

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Outer Harbor President Roads & Nantasket Roads	23.0	SB	PS	Coliform bacteria Metals	Point sources
Inner Harbor	2.3	SC	PS	Metals, Coliform bacteria, Aesthetics Oil and grease Dissolved oxygen	Point sources In-place sediments Debris, Water traffic, Upstream sources
Dorchester Bay	4.6	SB	PS	Coliform bacteria Dissolved oxygen, Metals	Point sources
Quincy Bay (portion designated SA)	1.0	SA	PS	Coliform bacteria, Restricted shellfishing/swimming	Storm sewers
(excluding portion designated SA)	4.7	SB	PS	Coliform bacteria	Point sources
Hingham Bay vicinity Nut Island WWTP	1.0	SB	PS	Coliform bacteria	Storm sewers
Hingham Bay	5.8	SB	S	--	Tributary pollutants
Hingham Harbor	1.1	SA	PS	Coliform bacteria Restricted shellfishing	Storm sewers
Hull Bay	2.3	SB	S	--	--
Winthrop Bay	1.5	SB	PS	Coliform bacteria, Metals	Point sources

Square Miles Assessed: 47.3 mi^2
Square Miles Supporting Classification: 8.1 mi^2
Square Miles Partially Supporting Classification: 39.2 mi^2

BUZZARDS BAY DRAINAGE BASIN

Nonpoint Source Conditions

Agriculture sources are largely confined to two (2) subwatersheds. The Westport River watershed appears to experience significant declines in water quality after rain events. High coliform bacteria levels in the overlying waters necessitated the closure of productive shellfish beds. A likely major contributor is the runoff from farm lands and feed lots of the dairy and beef herds located along the river and its tributaries. The other source are the potential contributions from the extensive cranberry growing industry which occupies much of the wetlands in the eastern portions of the basin. Nutrients and pesticides are suspected in this runoff.

Other sources common to many of the inner embayments and estuaries are periodic waste discharges from boats. The Bay contains an estimated 4300 mooring slips and given the large number of inner empayments which contain a marina(s) it is likely that periodic declines in water quality during the summer can be attributed to this source.

Runoff from street drains has been identified as a major contributor to water quality declines due to the flushing of animal wastes, oils, heavy metals, nutrients and other contaminants during rain events. A recent study completed in Buttermilk Bay has identified street drains as the principal source of bacterial contamination. The problem which formerly extended from the urbanized areas of the basin has been expanded throughout the basin as more and more areas comes under development and runoff is discharged to receiving water bodies.

Leachate from landfills contributes significantly to nonpoint source pollution within the Buzzards Bay Drainage.

Failing septic systems are identified as a likely contributor. Individual septic systems provide waste disposal for the majority of the drainage basin. Old systems, systems located at or close to the groundwater table or surface water brooks are often identifed as a significant potential sources.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Buttonwood Pond, New Bedford	12	Surface runoff

BUZZARDS BAY DRAINAGE BASIN

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Buttermilk Bay	0.56 mi^2 0.18 mi^2	SA	S PS	Coliform bacteria Shellfish bans Nutrients	Surface runoff Boats, Storm sewers Septic systems Waterfowl
Onset Bay	0.78 mi^2	SA	S	Coliform bacteria	Surface runoff Boats, Storm Sewers Septic systems
Wareham River	2.6-0.6 0.6-0.0	SA	S PS	Coliform bacteria Low D.O. Shellfish bans	Surface runoff Boats
Weweantic River, above Horseshoe Pond	7.4-4.4	B	PS	Coliform bacteria Low D.O.	Surface runoff Septic systems
Weweantic River from Horseshore Pond to mouth	4.4-0.0	SA	PS	Coliform bacteria	Surface runoff Septic systems
Sippican River above County Road	6.8-2.1	B	PS	Coliform bacteria	--
Sippican River, County Road to mouth	2.1-0.0	SA	PS	Coliform bacteria D.O.	Surface runoff Septic systems
Sippican Harbor	2.00 mi^2 0.76 mi^2	SA	S PS	Coliform bacteria D.O. Shellfish bans	Surface runoff Boats
Aucoot Cove	0.47 mi^2	SA	S	Coliform bacteria	Point sources
Hiller Cove	--	SA	PS	Coliform bacteria Shellfish bans	Unknown

BUZZARDS BAY DRAINAGE BASIN (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Mattapoisett Harbor	1.02 mi^2	SA	PS	Coliform bacteria Shellfish bans	Surface runoff Boats, Storm sewers
Mattapoisett River	9.5-0.0	B	PS	Coliform bacteria	Surface runoff Septic systems
Westport River, West Branch	1.71 mi^2 0.22 mi^2	SA	S PS	Coliform bacteria Shellfish bans	Surface runoff
Clark Cove	1.15 mi^2	SA	PS	Coliform bacteria PCB, Metals Nutrients Shellfish bans	Point Sources Surface runoff Sediments Storm sewers
Apponagansett Bay	0.46 mi^2 0.45 mi^2	SA	S PS	Coliform bacteria D.O. Shellfish bans	Storm sewers Surface runoff Waterfowl, Boats
Westport River, East Branch from Outlet of Lake Noquochoke to old County Road	2.0-0.0	B	PS	Coliform bacteria	Surface runoff
Westport River from Old County Rd. to mouth	1.55 mi^2 1.55 mi^2	SA	S PS	Coliform bacteria Shellfish bans Nutrients	Storm sewers, Surface runoff, Septic systems Feedlot runoff Pasture runoff
New Bedford Inner Harbor from Cogge- shall Bridge to Hurricane Barrier	1.17 mi^2	SB	NS	Dissolved Oxygen Coliform bacteria Metals PCB, Nutrients Shellfish bans	Point sources Surface runoff Sediments Boats Storm sewers

BUZZARDS BAY DRAINAGE BASIN (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Outer New Bedford Harbor	4.1 mi^2	SA	PS	Coliform bacteria Metals PCB, Shellfish bans	Point sources Sediment Storm sewers
Agawam River above Wareham WWTP	4.0-2.0	B	S	Coliform bacteria	Surface runoff Septic systems
Agawam River below Wareham WWTP	2.0-0.0	B	PS	Coliform bacteria Algae Shellfish bans	Surface runoff Waterfowl Point sources
Wankinco River	4.5-1.0 1.0-0.0	B	S PS	Coliform bacteria Nutrients	Surface runoff Landfill Leachate Septic Systems
Acushnet River to Hamlin Road	3.7-1.0	B	PS	Coliform bacteria	Surface runoff Septic systems
Acushnet River from Hamlin Rd. to Main St.	1.0-0.0	B	PS	Coliform bacteria D.O. Nutrients	Surface runoff Septic systems
Acushnet River Estuary from Main St., to Coggeshall St. bridge	0.32 mi^2	SB	NS	Dissolved Oxygen Coliform bacteria Metals PCB, Nutrients Shellfish bans	Point sources Sediments
Slocums River	2.6 mi^2	SA	S	--	--

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Paskamanset River	9.6-0.0	B	PS	Coliform bacteria D.O. Priority pollutants	Surface runoff Septic systems Sediments
Shingle Island River	2.0-0.0	B	PS	Coliform bacteria Toxics	Surface runoff Hazardous Waste Site
Buttonwood Brook	3.8-0.0	B	PA	Coliform bactria D.O. Nutrients	Surface runoff
Cape Cod Canal	5.9-0.0 6.0-5.9	SB	S PS	Coliform bacteria Oil spillage Shellfish bans	Point sources Boats Surface runoff

Miles Assessed: 63.4 mi
Miles Supporting Classification: 14.4 mi
Miles Partially Supporting Classification: 48.0 mi

Square Miles Assessed: 29.75 mi^2
Square Miles Supporting Classification: 17.79 mi^2
Square Miles Partially Supporting Classification: 8.02 mi^2

Nonpoint Source Conditions

The nonpoint sources in the Cape Cod Basin include faulty septic systems, marinas, waterfowl, street runoff, and agricultural runoff. Commercial fishermen emptying their bilges have also been a source. It should be noted that all freshwater streams have the water use Classification B.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Ashumet Pond, Mashpee	203	Surface runoff, Subsurface runoff from Otis A.F.B.
Bearse Pond, Barnstable	65	Surface runoff Septic systems
Eel Pond, Falmouth	UNK	Surface runoff, Boats
Great Pond, Eastham	109	Septic systems
Hamblin's Pond, Barnstable	149	Surface runoff
Herring Pond, Eastham	43	Surface runoff
Long Pond, Barnstable	50	Surface runoff Septic systems
Long Pond, Wellfleet	59	Septic systems
Mashpee/Wakeby Ponds, Mashpee	729	Septic systems
Perch Pond, Falmouth	UNK	Surface runoff, (shellfish bans)
Oyster Pond, Chatham	UNK	Septic systems (shellfish bans)
Meetinghouse Pond, Orleans	UNK	Surface runoff (shellfish bans)
Red Lily Pond, Barnstable	13	Surface runoff Septic systems
Santuit Pond, Mashpee	172	Surface runoff Septic systems
Shallow Pond, Barnstable	67	Surface runoff Septic systems
Sheep Pond, Brewster	148	Surface runoff Septic systems
Swan Pond, Dennis	UNK	Surface runoff Septic systems
Wequaquet Lake, Barnstable	654	Surface runoff Septic systems

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Barnstable Harbor, Barnstable	2.56 mi^2	SA	PS	Coliform bacteria	Surface runoff
Bumps River, Barnstable	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff
Centerville Harbor, Barnstable	1.44 mi^2	SA	PS	Coliform bacteria	Surface runoff
Centerville River, Barnstable	--	B	PS	Coliform bacteria Shellfish bans	Surface runoff Marinas
Hyannis Harbor, Barnstable	0.47 mi^2	SA	PS	Coliform bacteria Shellfish bans	Surface runoff Marinas
Maraspin Creek, Barnstable	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff
Prince Cove, Barnstable	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff
Shoestring Bay, Barnstable	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff
Back River, Bourne	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff Septic systems

CAPE COD DRAINAGE BASIN (CONTINUED)

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Pocasset River, Bourne	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff
Red Brook Harbor, Bourne	2.18 mi^2	SA	PS	Coliform bacteria Shellfish bans	Surface runoff Marinas
Quivett Creek, Brewster	--	SA	PS	Coliform bacteria	Surface runoff
Stoney Brook, Brewster	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff
Chatham Harbor, Chatham	6.06 mi^2	SA	PS	Coliform bacteria	Surface runoff Marinas
Frostfish Creek, Chatham	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff
Red River, Chatham	--	SA	PS	Coliform bacteria	Surface runoff
Stage Harbor, Chatham	0.86 mi^2	SA	PS	Coliform bacteria	Surface runoff Marinas
Bass River, Dennis	--	SA	PS	Coliform bacteria	Surface runoff

CAPE COD DRAINAGE BASIN (CONTINUED)

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Sesuit Creek, Dennis	--	SA	PS	Coliform bacteria	Surface runoff
Swan Pond River, Dennis	--	SA	PS	Coliform bacteria	Surface runoff
Boat Meadow River, Eastham	--	SA	PS	Coliform bacteria	Surface runoff
Rock Harbor Creek, Eastham	--	SA	PS	Coliform bacteria	Surface runoff
Falmouth Inner Harbor, Falmouth	--	SB	PS	Coliform bacteria Shellfish bans	Surface runoff Marinas
Great Harbor, Falmouth	0.35 mi^2	SA	PS	Coliform bacteria Shellfish bans	Surface runoff Marinas
Herring Brook, Falmouth	--	SA	PS	Coliform bacteria	Surface runoff Marinas
Little Harbor, Falmouth	0.05 mi^2	SA	PS	Coliform bacteria Shellfish bans	Surface runoff Marinas
Megansett Harbor, Falmouth	1.39 mi^2	SA	PS	Coliform bacteria	Surface runoff Marinas

CAPE COD DRAINAGE BASIN (CONTINUED)

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Moonakiss River, Falmouth	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff
Pocasset Harbor, Bourne	--	SA	PS	Coliform bacteria D.O.	Surface runoff Septic system Boats
Quisset Harbor, Falmouth	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff Marinas
Little Sippewisset Creek, Falmouth	--	SA	S	D.O.	Surface runoff
Great Sippewisset Creek, Falmouth	--	SA	S	D.O.	Surface runoff
Phinneys Harbor, Bourne	--	SA	PS	Coliform bacteria Shellfish bans D.O.	Surface runoff Septic systems
Waquoit Bay, Falmouth	1.54 mi^2	SA	PS	Coliform bacteria	Surface runoff Marinas

CAPE COD DRAINAGE BASIN (CONTINUED)

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Wild Harbor, Falmouth	--	SA	PS	Coliform bacteria	Septic systems Boats
Wild Harbor River, Falmouth	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff
West Falmouth Harbor, Falmouth	--	SA	PS	Coliform bacteria D.O.	Surface runoff Septic systems Boats
Herring River, Harwich	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff Waterfowl
Red River, Harwich	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff
Saquatucket Harbor, Harwich	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff
Mashpee River, Mashpee	--	B	PS	Coliform bacteria Shellfish bans	Surface runoff
Red Brook, Mashpee	--	SA	PS	Coliform bacteria	Surface runoff
Shoestring Bay, Mashpee	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff

CAPE COD DRAINAGE BASIN (CONTINUED)

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Little Namskaket Creek, Orleans	--	SA	PS	Coliform bacteria	Surface runoff
Namskaket Creek, Orleans	--	SA	PS	Coliform bacteria	Surface runoff
Nauset Harbor, Orleans	2.00 mi^2	SA	PS	Coliform bacteria	Surface runoff Marinas
Provincetown Harbor, Provincetown	3.82 mi^2	SA	PS	Coliform bacteria Shellfish bans	Septic systems Marinas
Old Harbor/Mill Creek, Sandwich	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff Boats
Scorton Creek, Sandwich	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff Septic systems
Pamet River, Truro	--	SA	PS	Coliform bacteria	Surface runoff
Duck Creek, Wellfleet	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff
Herring River, Wellfleet	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff

CAPE COD DRAINAGE BASIN (CONTINUED)

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Wellfleet Harbor, Wellfleet	7.27 mi^2	SA	PS	Coliform bacteria	Surface runoff Marinas
Chase Garden Creek, Yarmouth	--	SA	PS	Coliform bacteria	Surface runoff
Lewis Bay, Yarmouth	1.35 mi^2	SA	PS	Coliform bacteria	Surface runoff
Mill Creek, Yarmouth	--	SA	PS	Coliform bacteria Shellfish bans	Surface runoff
Parker River, Yarmouth	--	SA	PS	Coliform bacteria	Surface runoff

Square Miles Assessed: 25.59 mi^2
Square Miles Supporting Classification: 0.0 mi^2
Square Miles Partially Supporting Classification: 25.59 mi^2

Nonpoint Source Conditions

The lower Charles River and Charles River Basin receives much of its degradation from urban and storm runoff. These are often combined with sewers and overflow as combined sewer overflows.

Another major factor is failing septic systems in many of the towns near the headwaters of the Charles. Various towns have hired consulting engineers to study the problem and a few towns are beginning to sewer the problem areas.

Much of the Charles River travels through extensive wetlands and marshes. Although these are beneficial in their flood protection, they also contribute tannins, organic matter and D.O. violations. These are natural conditions that cannot be improved.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Bullough's Pond, Newton	6	Surface runoff
Cedar Swamp Pond, Milford	104	Surface runoff
Chandler Pond, Brighton	11	Surface runoff
Hall's Pond, Brookline	2	Surface runoff
Hardy Pond, Brookline	41	Surface runoff
Jennings Pond, Natick	10	Surface runoff
Scarborough Pond, Boston	7	Surface runoff
Lake Winthrop, Holliston	150	Septic systems Surface runoff

CHARLES RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Charles River Headwaters in Hopkinton to Dilla Street, Milford	78.9-76.5	A	S	--	--
Charles River from Dilla St., Milford to Box Pond, Bellingham	76.5-70.3	B	NS	Coliform bacteria Dissolved oxygen Solids, Nutrients	Surface runoff Storm sewers
Box Pond, Bellingham to Chestnut St., Needham	70.3-33.0	B	S	D.O., Color	Natural conditions due to wetlands
Charles River from Chestnut St., Needham to Watertown Dam, Watertown	33.0-9.8	B	PS	Dissolved oxygen Coliform bacteria Color	Surface runoff Storm sewers Point sources
Charles Basin Watertown Dam to the Charles River Dam, Boston	9.8-0.0	C	NS	Coliform bacteria Dissolved oxygen Oil & grease	Sediments Point sources

CHARLES RIVER BASIN (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Stop River Headwaters in Wrentham to Norfolk-Walpole MCI WWTP, Cedar Jct.	8.8-4.1	B	S	--	--
Stop River from Norfolk-Walpole MCI WWTP to confluence with the Charles River, Medfield	4.1-0.0	B	PS	Dissolved oxygen	Point sources Natural wetlands
Back Bay Fens from the Muddy River to the confluence with the Charles Basin, Boston	1.5-0.0	C	NS	Coliform bacteria Dissolved oxygen	Combined sewer overflows, In-place sediments, Surface runoff Storm sewers
Muddy River from Jamaica Pond to the Back Bay Fens, Boston	2.7-0.0	B	NS	Coliform bacteria Dissolved oxygen	Combined Sewer Overflows, Surface Runoff Storm sewers

Miles Assessed: 91.9 mi
Miles Supporting Classification: 44.4 mi
Miles Partially Supporting Classification: 27.3 mi

CHICOPEE RIVER BASIN

Nonpoint Source Conditions

In the Ware River Basin, failing septic systems in Barre will be eliminated with the construction of the new collection and treatment system. Isolated discharges in Wheelwright and Gilbertville slightly impact the river. Agricultural runoff in Ware and Palmer cause elevated coliform counts in the vicinity of Gibbs Crossing and into Palmer. Surface runoff in Ware and Palmer contributed nutrients to the Ware impoundment and the Diamond International impoundment. In the Quaboag River Basin nonpoint sources are limited to surface runoff in Warren, occasional stormwater runoff in Palmer and failing septic systems in Brookfield. In the Chicopee River, surface runoff in Palmer and failing septic systems in Wilbraham contribute to occasional elevated coliform counts.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Five Mile Pond, Springfield	36	Surface runoff
Lake Lashaway, East Brookfield	270	Surface runoff
Long Pond, Springfield	18	Surface runoff
Lake Lorraine, Springfield	27	Surface runoff
Mona Lake, Springfield	11	Septic systems
Quaboag Pond, Brookfield	531	Surface runoff Septic systems
Quacumquasit Pond, Brookfield	218	Septic systems
Queen Lake, Phillipston	138	Surface runoff
Red Bridge Impoundment, Ludlow	83	Surface runoff

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Ware River Basin					
East Branch Ware River from Rutland to Barre Falls Dam, Barre	4.8-0.0	A	S	--	--
West Branch Ware River and Ware River above MDC intake, Barre	46.0-29.1	A	S	--	--
MDC intake to South Barre	29.1-27.3	B	S	--	--
South Barre to Wheelwright Dam, Wheelwright	27.3-23.3	B	PS	Coliform bacteria	Septic systems
Wheelwright Dam to Ware Dam, Ware	23.3-12.2	B	PS	Coliform bacteria	Point sources
Ware Dam to Gibbs Crossing, Ware	12.2-8.3	B	PS	Coliform bacteria	Surface runoff
Gibbs Crossing to confluence with Quaboag River, Palmer	8.3-0.0	B	S	Phosphorus	Surface runoff
Prince River	8.4-0.0	B	S	--	--
Swift River above Windsor Dam, Belchertown	9.8+	A	S	--	--
Windsor Dam to Bondsville	9.8-4.4	B	PS	Solids, Nutrients	Point sources
Bondsville to confluence with Ware River, Palmer	4.4-0.0	B	PS	Coliform bacteria	Septic systems

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Quaboag River Basin					
Seven Mile River from Source to Spencer WWTP, Spencer	8.6-2.4	B	S	D.O.	Natural conditions
Spencer WWTP to confluence with East Brookfield River, East Brookfield	2.4-0.0	B	PS	Dissolved oxygen Nutrients	Point sources, Natural conditions
East Brookfield River to Quaboag Pond, East Brookfield	2.2-0.0	B	S	Dissolved oxygen	Natural conditions
Quaboag River from Brookfield to Route 67 bridge, West Brookfield	24.9-19.2	B	S	Dissolved oxygen	Natural conditions
Route 67 bridge to Route 32 bridge, Palmer-Monson	19.2-5.1	B	PS	Coliform bacteria	Surface runoff
Route 32 bridge to confluence with Ware River, Palmer	5.1-0.0	B	PS	Coliform bacteria	Surface runoff
Dunn Brook above North Brookfield WWTP, Brookfield	4.9-3.4	B	S	--	--
North Brookfield WWTP to confluence with Quaboag River, Brookfield	3.4-0.0	B	PS	Phosphorus, Coliform bacteria	Wetlands Septic systems

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Chicopee Brook, headwaters to Monson Center.	7.0-3.0	B	S	--	--
*Chicopee Brook, to confluence with Quaboag River	3.0-0.0	B	U	Nutrients, D.O. Solids, Coliform bacteria	Storm sewers
*Tributary along Palmer Upper Rd., Monson to Chicopee Brook	1.2-0.0	B	U	Nutrients, D.O. Coliform bacteria	Surface runoff
Chicopee River					
Source in Palmer to Red Bridge impoundment	17.9-15.2	B	PS	Coliform bacteria Phosphorus	Surface runoff Point sources
Red Bridge Dam to Chicopee Falls, Chicopee	15.2-3.0	B	PS	Coliform bacteria	Surface runoff Point sources
Chicopee Falls to confluence with Connecticut River, Chicopee.	3.0-0.0	B	NS	Dissolved Oxygen Solids, Coliform bacteria	Surface runoff Point sources
*Calkins Brook Headwater, Monson	3.0-2.8	B	U	Nutrients, D.O. Solids, Coliform bacteria	Surface runoff

Miles Assessed: 134.5 mi
Miles Supporting Classification: 62.8 mi
Miles Partially Supporting Classification: 68.7 mi

* = Evaluated Information

Nonpoint Source Conditions

Nonpoint pollution due to agricultural runoff, septic system failures and domestic fertilizers is a problem affecting waterbodies throughout the Pioneer Valley. A study by the DEQE, Division of Water Supply has shown significant areas of regional aquifers in Hatfield and Whately have been contaminated by pesticides such as EDB and Temik. Road salt runoff has contaminated numerous wells in Belchertown, Pelham and Granby. A landfill has forced the closing of a public well in Amherst. Water quality problems in the lower Connecticut River are attributed to CSO's (considered point discharges).

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Arcadia Lake, Belchertown	40	Surface runoff
Lake Bray, Holyoke	12	Septic systems
Dimmock Pond, Springfield	11	Surface runoff
Forge Pond, Granby	68	Surface runoff
Loon Pond, Springfield	29	Surface runoff
Lake Massasoit, Springfield	200	Surface runoff
Metacomet Lake, Belchertown	74	Septic systems
Nashawannuck Pond, Easthampton	22	Surface runoff
Porter Lake, Springfield	28	Surface runoff
Puffer's Pond, Amherst	11	Surface runoff
Von Horn Pond, Springfield	9	Unknown
Venture Pond, Springfield	8	Surface runoff
Lake Warner, Hadley	UNK	Surface runoff
Willow Lake, Northampton	4	Surface runoff

CONNECTICUT RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Connecticut River					
NH/MA line to Rte. 10 Bridge, Northfield	138.2-134.7	B	PS	Coliform bacteria	NH discharges
Rte. 10 Bridge, Northfield to Turner Falls Dam, Montague	134.7-123.8	B	S	--	--
Turners Falls Dam to confluence with Deerfield River, Greenfield	123.8-120.8	B	PS	Coliform bacteria	Point sources
Deerfield River to Holyoke Dam, Holyoke	120.8-86.6	B	S	Higher flows Nutrients	Surface runoff Sediments
Holyoke Dam to CT line, Longmeadow/Agawam	86.6-70.7	B	NS	Coliform bacteria	Point sources
*Temple Brook tributary along May Hill Rd, Monson to Temple Brook	4.0-2.7	B	U	Nutrients, D.O. Solids, Coliform bacteria	Surface runoff
*Temple Brook, Headwaters at Hampton Rd., Monson	2.8-2.7	B	U	Nutrients, D.O., Solids Coliform bacteria	Surface runoff
Weston Brook, Lampson Brook, Belchertown-Granby	12.4-9.1	B	PS	Nutrients, Dissolved oxygen	Point sources
Outlet of Forge Pond in Granby to the Connecticut River in South Hadley	9.1-0.0	B	S	--	--

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Miles Assessed: 79.9 mi
Miles Supporting Classification: 54.2 mi
Miles Partially Supporting Classification: 9.8 mi
* = Evaluated Information

DEERFIELD RIVER BASIN

Nonpoint Source Conditions

Potential nonpoint pollution sources in the Deerfield River Basin include stormwater runoff, landfill leachate, agricultural runoff, and subsurface disposal. Surveys conducted by the Division to date, however, have not documented significant levels of pollutant loadings from any of these sources.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Ashfield Pond, Ashfield	39	Septic systems

DEERFIELD RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Deerfield River					
Vermont Line to Cold River, Charlemont	42.4-29.6	B	S	--	--
Cold River to Dam 4, Charlemont	29.6-19.7	B	S	--	--
Dam 4, Charlemont to Connecticut River, Greenfield-Deerfield	19.7-0.0	B	S	--	--
North River					
Vermont line to Deerfield River, Charlemont-Shelburne	9.5-0.0	B	S	--	--
Green River					
Vermont line to Greenfield STP, Greenfield	14.0-0.5	B	S	--	--
Greenfield STP to Deerfield River, Greenfield	0.5-0.0	B	PS	Nutrients, Chlorine residual, Solids	Point sources
South River					
Outlet Ashfield Pond to Emmets Road, Ashfield	13.3-11.4	B	NS	Coliform bacteria Nutrients	Point sources
Emmets Road, Ashfield to Deerfield River, Conway	11.4-0.0	B	S	--	--

Miles Assessed: 79.2 mi
Miles Supporting Classification: 76.8 mi
Miles Partially Supporting Classification: 0.5 mi

FARMINGTON RIVER BASIN

Nonpoint Source Conditions

Potential sources of nonpoint pollution in the Farmington River Basin include agricultural runoff, landfill leachate and subsurface disposal. Nonpoint pollution is not considered a significant problem in the Farmington River Basin.

FARMINGTON RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Farmington River					
West Branch from Becket to 1,000 ft. from Connecticut state line, Sandisfield-Tolland	14.6-0.1	B	S	Coliform bacteria	Surface runoff
West Branch 1,000 ft. from state line to state line, Sandisfield-Tolland	0.1-0.0	A	S	--	--
Fall River from source to confluence with West Branch, Otis	1.0-0.0	B	S	--	--
Clam River from source in Otis to confluence with West Branch, Sandisfield	10.0-0.0	B	S	--	--

Miles Assessed: 25.6 mi
Miles Supporting Classification: 25.6 mi
Miles Partially Supporting Classification: 0.0 mi

FRENCH RIVER BASIN

Nonpoint Source Conditions

The major cause of the nonpoint source problems in the French River is from the accumulation of sludge deposits in the numerous impoundments below the WWTP's. These sludge deposits contain high nutrient organic and metal concentrations which degrades the overlying water. In addition, urban runoff in Webster affects part of the French River, and a Pig Farm in Oxford affects Wellington Brook, a tributary to the French River. Failing septic systems also contribute to nonpoint pollution.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Webster Lake, Webster	1181	Surface runoff Septic systems

FRENCH RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
French River					
Above Leicester WWTP, Leicester	27.7-27.3	B	S	--	--
Leicester WWTP to Greenfield Pond	27.3-24.8	B	NS	Coliform bacteria, D.O. Nutrients	Septic systems
Greenfield Pond to N. Oxford Dam, Oxford	24.8-19.3	B	PS	Coliform bacteria, D.O. Nutrients	Point sources
N. Oxford Dam to North Dam, Webster	19.3-10.0	B	S	--	--
North Dam, Webster to Webster-Dudley WWTP's, Webster	10.0-8.5	B	PS	D.O., Coliform bacteria	Surface runoff
Webster Dudley WWTP's to state line	8.5-7.0	B	NS	Coliform bacteria, D.O. Solids, Phosphorus	Sludge deposits
Burncoat Brook, Leicester	1.2-0.0	B	S	--	--
Barton's Brook, Leicester	1.2-0.0	B	S	--	--
Little River, Charlton and Oxford	9.1-0.0	B	S	--	--
Mill Brook, Webster	0.8-0.0	B	NS	Metals	Point sources Sediments
Wellington Brook, Oxford	2.5-0.0	B	PS	Coliform bacteria	Surface runoff Point sources

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Miles Assessed: 35.5 mi
Miles Supporting Classification: 21.2 mi
Miles Partially Supporting Classification: 9.5 mi

HOOSIC RIVER BASIN

Nonpoint Source Conditions

The impact of nonpoint sources upon the water quality of the Hoosic River originates from two main sources - urban runoff and dairy farm runoff. The former is typical of rivers which flow through urban centers and include exfiltration from sewer lines, stormwater inflow and contaminated groundwater flow from failing septic systems. These are potential problems in the Hoosic Basin and should be subject to future investigation. Dairy runoff occurs in the Green River Basin; the impact results in increased bacteria levels and adds some nutrients.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Cheshire Reservoir, Cheshire	418	Surface runoff

HOOSIC RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Hoosic River					
North branch from state line to USGS gage, N. Adams	5.6-1.8	B	S	Solids	Natural conditions
North branch from USGS gage, N. Adams to confluence with south branch, N. Adams	1.8-0.0	B	NS	Fecal coliform	Point sources
South branch from outlet of Cheshire Reservoir to confluence with north branch, N. Adams	21.5-16.8	B	S	--	--
Mainstem from confluence of north and south branches to state line, Williamstown	16.8-0.0	B	PS	Fecal coliform	Surface runoff
Green River					
New Ashford to confluence with Hoosic River, Williamstown	10.8-0.0	B	PS	Fecal coliform	Surface runoff

Miles Assessed: 37.9 mi
Miles Supporting Classification: 8.5 mi
Miles Partially Supporting Classification: 27.6 mi

HOUSATONIC RIVER BASIN

Nonpoint Source Conditions

The Housatonic River has significant nonpoint source loadings, particularly from agricultural and dairy imputs and in very significant amounts in the lower section of the basin from the Ten Mile River in New York. The states of Massachusetts and Connecticut and the USEPA undertook an intensive monitoring program in 1981-2 to determine the impact of nutrient loadings to the river particularly to the Housatonic lakes in central Connecticut. The results of the study indicated that there was significant nutrient loadings from runoff, large amounts following precipitation events. In addition, the study lead to the imposition of a phosphorus limit for the Pittsfield WWTP. Unfortunately, the trophic condition of the lakes has not improved, adding evidence to the dominance on nonpoint inputs to the water quality of the Housatonic. An additional nonpoint source is failing septic systmes.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Lake Buel, Monterey	194	Surface runoff Septic systems
Center Pond, Dalton	UNK	Surface runoff
Lake Mansfield, Great Barrington	25	Surface runoff
Mill Pond, Sheffield	UNK	Surface runoff Septic systems
Onota Lake, Pittsfield	617	Surface runoff Septic systems
Pontoosuc Lake, Pittsfield	480	Surface runoff Septic systems
Richmond Pond, Pittsfield	218	Surface runoff
Silver Lake, Pittsfield	UNK	Surface runoff (PCB's)
Stockbridge Bowl, Stockbridge	374	Surface runoff
Woods Pond, Lee	UNK	UNK (PCB'S)

HOUSATONIC RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Housatonic River					
East branch from Hinsdale to Crane Paper Company, Pittsfield	13.6-2.0	B	S	Coliform bacteria	Surface runoff
East branch from Crane Paper Company to west branch, Pittsfield	2.0-0.0	B	PS	Coliform bacteria PCBs	Surface runoff
West branch from source to confluence with east branch, Pittsfield	4.7-0.0	B	PS	Coliform bacteria	Unknown
Mainstem from Pittsfield to outlet of Woods Pond, Lee	55.4-45.1	B	NS	Coliform bacteria Eutrophication, PCBs	Landfill leachate Surface runoff Point sources Sediments
Mainstem from outlet of Woods Pond to CT state-line, Sheffield	45.1-0.0	B	PS	Eutrophication, PCBs Coliform bacteria	Surface runoff Point sources Sediments
Williams River					
Williams River from source to W. Stockbridge	10.5-8.6	B	NS	Coliform bacteria	Point sources Septic systems
W. Stockbridge to confluence with Housatonic River, Great Barrington	8.6-0.0	B	S	--	--

Miles Assessed: 79.5 mi
Miles Supporting Classification: 20.2 mi
Miles Partially Supporting Classification: 47.1 mi

Nonpoint Source Conditions

Nonpoint sources provide another potential pollutant flow to the Ipswich River. As the river flows through several small towns, it is subject to runoff and septic tank leachate. Neither of these water quality impacts are now considered serious; hence the river meets its assigned classification. In the future, however, increasing development pressures in the Ipswich Basin could endanger the water quality.

Coliform bacteria samples taken in the tidal portion of the river in Ipswich have been in excess of the Commonwealth's water quality standards. Sources of bacteria may be stormwater runoff, illegal discharges or sewage pipe leakage. However, shellfish harvested in the Ipswich River or in proximal estuarine beds are reported to have very low bacterial counts.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Martin's Pond, North Reading	92	Surface runoff Septic systems
Silver Lake, Wilmington	28	Septic systems

IPSWICH RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
From its source in Wilmington to Sylvania Dam, Ipswich	36.6-4.5	B	S	Dissolved oxygen	Natural wetland condition
Sylvania Dam, Ipswich to mouth in Ipswich Bay, Ipswich	4.5-0.0	SA	PS	Coliform bacteria Shellfishing restricted	Point sources Unknown

Miles Assessed: 36.6 mi
Miles Supporting Classification: 32.1 mi
Miles Partially Supporting Classification: 4.5 mi

THE ISLANDS DRAINAGE BASIN

Nonpoint Source Conditions

The nonpoint sources on the Islands consist of faulty septic systems, marinas, street runoff, and waterfowl. These can be corrected by septic system rehabilitation and best management practices.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Edgartown Great Pond, Edgartown	911	Birds Septic systems (Shellfish bans)
Lagoon Pond, Oak Bluffs	535	Surface runoff Septic systems
Lake Tashmoo, Tisbury	259	Surface runoff Septic systems

THE ISLANDS DRAINAGE BASIN

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Nantucket Harbor	7.65 mi^2	SA	PS	Coliform bacteria Shellfish bans	Boats
Sesachacha Pond	0.43 mi^2	SA	S	--	--
Coskata Pond	0.70 mi^2	SA	S	--	--
Great Point Pond	--	SA	S	--	--
Chilmark Pond	0.18 mi^2	SA	S	--	--
Menemsha Pond	0.99 mi^2	SA	PS	Coliform bacteria Shellfish bans	Septic systems Boats
Oak Bluffs Harbor	0.05 mi^2	SA	PS	Coliform bacteria Shellfish bans	Boats
Cape Poge Bay	2.24 mi^2	SA	S	--	--
Cuttyhunk Pond, Gosnold	--	SA	PS	Coliform bacteria Shellfish bans	Septic systems Boats

THE ISLANDS DRAINAGE BASIN (CONTINUED)

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Vineyard Haven Harbor	2.60 mi^2	SA	PS	Coliform bacteria Shellfish bans	Boats
Sengekontacket Pond	1.57 mi^2	SA	PS	Coliform bacteria	Septic systems
Lagoon Pond	0.75 mi^2	SA	PS	Coliform bacteria Nutrients	Septic systems Surface runoff
Lake Tashmoo	0.36 mi^2	SA	S	--	--
Oyster Pond	0.19 mi^2	SA	S	--	--
Mattakeset Bay	--	SA	S	--	--
Edgartown Harbor	1.09 mi^2	SA	PS	Coliform bacteria	Boats
Katama Bay	2.60 mi^2	SA	S	--	--
Edgartown Great Pond	1.30 mi^2	SA	PS	Coliform bacteria Shellfish bans	Waterfowl
Tisbury Great Pond	1.2 mi^2	SA	PS	Coliform bacteria Shellfish bans	Septic systems
West End Pond	0.10 mi^2	SA	S	--	--

Square Miles Assessed: 23.37 mi^2
Square Miles Supporting Classification: 6.17 mi^2
Square Miles Partially Supporting Classification: 17.2 mi^2

Nonpoint Source Conditions

Nonpoint sources of pollutant loading to the Merrimack River are difficult to quantify and are probably masked by point source inputs. Violations of the water quality standards, particularly fecal coliform bacteria, are much more likely the result of point source inputs, such as CSO's, than nonpoint. However, since the Merrimack River flows through highly urbanized areas, with major highway crossings, urban runoff problems are likely, although, at present, unquantified. Nonpoint source assessment is clearly needed in this basin.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Lake Cochichewick, N. Andover	550	Construction/agricultural/ urban runoff Septic systems
Forest Lake, Methuen	55	Septic systems
Forge Pond, Westford	198	Surface runoff Septic systems
Long Pond, Dracut	163	Surface runoff
Lost Lake, Groton	204	Surface runoff Septic systems
Lake Mascuppic, Dracut	209	Septic systems
Mill Pond, Springfield	17	Surface runoff Septic systems

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Merrimack River					
MA/NH line to Tyngsborough Bridge, Tyngsborough	49.8-47.4	B	NS	Fecal coliform bacteria	Point sources
Tyngsborough Bridge to Pawtucket Dam, Lowell	47.4-40.6	B	NS	Fecal coliform bacteria Lead	Point sources
Pawtucket Dam to Essex Dam, Lawrence	40.6-29.0	B	NS	Fecal coliform bacteria Mercury, Lead, Copper	Point sources
Essex Dam to Little River, Haverhill	29.0-21.9	B	NS	Fecal coliform bacteria Lead,	Point sources
Little River to Rocks Bridge, Haverhill-West Newbury	21.9-11.8	SB	NS	Fecal coliform bacteria Lead	Upstream discharges Point sources
Rocks Bridge to Routes 1 and 1A Bridge, Newburyport	11.8-3.0	SB	PS	Fecal coliform bacteria Lead	Upstream sources
Routes 1 and 1A Bridge to the Atlantic Ocean, Newburyport	3.0-0.0	SB	NS	Fecal coliform bacteria Shellfish ban	Point sources Upstream sources
Beaver Brook, MA portion, Lowell	4.2-0.0	B	PS	Fecal coliform bacteria	Point sources
Spicket River, MA portion, Lawrence	6.4-0.0	B	NS	Fecal coliform bacteria, Phosphorus, Copper, Lead	Point sources Upstream sources

MERRIMACK RIVER BASIN (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Little River, MA portion, Haverhill	4.3-0.0	B	NS	Dissolved oxygen, Solids Fecal coliform bacteria	Point sources
Powwow River, MA portion, Merrimac	6.4-0.0	B/SB	NS	Fecal coliform bacteria Lead	Point sources Surface runoff
Black Rock Creek, entire length, Salisbury	1.7-0.0	SB	NS	Dissolved oxygen coliform bacteria Solids	Point sources

Miles Assessed: 72.8 mi
Miles Supporting Classification: 0.0 mi
Miles Partially Supporting Classification: 13.0 mi

MILLERS RIVER BASIN

Nonpoint Source Conditions

The most important nonpoint pollution source in the Millers River Basin is acid precipitation. Because of the geology of the basin, the surface waters have a low natural buffering capacity. Streams in the Millers are among the most affected in the state by acid rain. Runoff from Route 2 is a potential source of nonpoint pollution for the lower portion of the watershed. However, this has not been evaluated by the Division.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Dunn's Pond, Gardner	18	Surface runoff
Lake Ellis, Athol	67	Surface runoff Septic systems
Kendall Pond, Gardner	23	Surface runoff
Parker Pond, Gardner	26	Surface runoff

MILLERS RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Millers River					
Above Winchendon WWTP, Winchendon	35.7+	B	PS	Coliform bacteria	Point sources
Winchendon WWTP to Otter River, South Royalston	35.7-30.4	B	S	--	--
Otter River to South Royalston USGS Gage, South Royalston	30.4-25.6	B	PS	Dissolved oxygen Solids, Nutrients	Otter River
South Royalston USGS Gage to Erving Paper Company, Erving	25.6-8.1	B	S	--	--
Erving Paper Company to confluence with Connecticut River, Erving	8.1-0.0	B	PS	Solids	Point sources
Otter River					
Source to Gardner WWTP, Gardner	12.2-9.6	B	S	Dissolved oxygen	Naturally occurring low D.O. due to wetlands
Gardner WWTP to confluence with Millers River, Winchendon	9.6-0.0	B	PS	Dissolved oxygen Solids, Nutrients	Point sources
Beaver Brook					
Fernald School discharge to Millers River, Royalston	3.1-0.0	B	S	--	--

Miles Assessed: 51.0 mi
Miles Supporting Classification: 28.5 mi
Miles Partially Supporting Classification: 22.5 mi

MOUNT HOPE BAY DRAINAGE BASIN

Nonpoint Source Conditions

The impact of nonpoint sources upon the water quality of the Mount Hope Bay Basin are typical of urban drainage systems particularly those associated with combined sewers in the collection systems. The major impacts are on the closing of shellfish beds in the basin. Failing septic systems, surface runoff, sediments and point sources are the major source of problems.

MOUNT HOPE BAY DRAINAGE BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Lee River					
Lewin Brook from Gardner's Neck Rd., Swansea to Route 103 bridge on Wilbur Ave., Swansea	3.2-1.9	B	PS	Coliform bacteria Dissolved oxygen	Septic systems
Estuary, Route 6 Fall River Rd., Swansea/Somerset to Route 103 Wilbur Ave., Swansea/Somerset	1.9-1.4	SB	PS	Coliform bacteria Dissolved oxygen Shellfish ban	Septic systems Surface runoff Point sources Sediments
Cole River					
Wood Street bridge to Fall River Road (Rt. 6), Swansea	5.0-3.6	B	NS	Coliform bacteri a Dissolved oxygen	Septic systems Surface runoff
Estuary, from Fall Rd. (Rt. 6) to Wilbur Ave. bridge (Rt. 103) Swansea/Somerset	3.6-1.9	SB	NS	Coliform Bacteria Shellfish ban	Septic systems Point sources Surface runoff
Quequechan River					
Route 6 bridge, outlet to South Watuppa Pond, Fall River to Veaduct St. bridge, at Battleship Cove, Fall River	2.3-0.0	B	NS	Coliform bacteria Dissolved oxygen	Point sources Sediments

Miles Assessed: 7.2 mi
Miles Supporting Classification: 0 mi
Miles Partially Supporting Classification: 1.8 mi

MYSTIC RIVER BASIN

Nonpoint Source Conditions

The Mystic River Basin is affected by urban-type nonpoint sources such as stormwater, in-place sediment, and accelerated eutrophication from excessive nutrient input. The basin was part of the nation-wide National Urban Runoff Program (NURP) in the late 1970's. The study identified the source and magnitude of runoff upon the integrity of the water quality of the Mystic River.

The deliniation of the effect of nonpoint inputs upon the integrity of the Mystic River is difficult due to the severe impact of chemical lagoon leachate and the preponderance of combined sewer overflows to the river. The Upper and Lower Mystic Lakes are surely impacted by nonpoint sources, in particular nutrients, and in the case of the lower lake, by increased saline levels in the hypolimnion. A destratification project is underway at the lower lake which will hopefully eliminate the trapped anaerobic layer.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Black's Nook Pond, Cambridge	2.5	Surface runoff
Ell Pond, Melrose	23	Surface runoff
Hills Pond, Arlington	2	Surface runoff
Horn Pond, Woburn	104	Surface runoff Septic systems
Spy Pond, Arlington	103	Surface runoff
Upper Mystic Lake, Winchester	167	Surface runoff
Wedge Pond, Winchester	21	Surface runoff

MYSTIC RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Aberjona River from its source in Reading to the Mystic Lakes. Upper and Lower Mystic Lakes. Mystic River to Amelia Earhart Dam, Somerville	18.4-2.0	B	NS	Ammonia, Dissolved oxygen, Coliform bacteria, Metals	Industrial lagoon Leachate, Point sources, Surface runoff
Alewife Brook from Fresh Pond, Cambridge to confluence with Mystic River, Arlington-Somerville	2.0-0.0	B	NS	Coliform bacteria Dissolved oxygen Ammonia.	Point sources

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Miles Assessed: 16.4 mi
Miles Supporting Classification: 0.0 mi
Miles Partially Supporting Classification: 0.0 mi

NASHUA RIVER BASIN

Nonpoint Source Conditions

Although the Nashua River itself is dominated by point sources, nonpoint sources impact the Nashua River, Whitman River, Fall Brook, and James Brook. Agricultural runoff in Lancaster, Ayer, and Groton and surface runoff from Fort Devens cause elevated coliform counts in the Nashua River and nutrient build up in Pepperell Pond. Runoff from East Pepperell contributes to coliform and nutrients downstream from the pond. Untreated municipal discharges in Ashburnham cause coliform bacteria in the Whitman River. In Fall Brook and the Still River, coliform problems may be caused by surface runoff.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Bare Hill Pond, Harvard	316	Surface runoff Septic systems
Eagle Lake, Holden	84	Surface runoff
East Lake Waushakum, Sterling	188	Septic systems
Grove Pond, Ayer	67	Surface runoff
Harbor Pond, Townsend	47	Surface runoff Septic systems
Lake Shirley, Lunenburg	374	Surface runoff
Wyman Pond, Westminster	200	Surface runoff Septic systems

NASHUA RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
North Nashua River					
Fitchburg Westerly WWTP to Fitchburg Paper Co., Mill #1 Dam, Fitchburg	56.1-54.8	B	PS	D.O., Suspended solids	Point sources, Surface runoff
Fitchburg Paper Co. to Leominster WWTP, Leominster	54.8-46.4	B	NS	Fecal coliform bacteria Suspended solids Nutrients	Point sources, Surface runoff
Leominster WWTP to confluence with south branch, Lancaster	46.4-36.5	B	PS	Coliform bacteria Suspended solids	Point sources Surface runoff Upstream sources
Nashua River					
Confluence of north and south branches to Harvard/ Shirley line, Ayer	36.5-29.2	B	NS	Fecal coliform bacteria Dissolved oxygen Nutrients	Upstream discharges Surface runoff
Harvard/Shirley line to confluence with Squannacook Squannacook River, Shirley	29.2-23.0	B	PS	Fecal coliform bacteria Dissolved oxygen	Surface runoff
Confluence with Squannacook River to Pepperell Dam, Pepperell	23.0-14.2	B	S	--	--
Pepperell Dam to New Hampshire state line, Pepperell	14.2-10.5	B	PS	Fecal coliform bacteria Nutrients	Surface runoff
South branch Nashua River above Clinton WWTP, Clinton	4.6-1.6	B	S	Coliform bacteria	Septic systems
Clinton WWTP to confluence with the Nashua River, Lancaster	1.6-0.0	B	NS	Dissolved Oxygen Ammonia, Phosphorus	Point sources

NASHUA RIVER BASIN (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Flag Brook from outlet of Crocker Pond to confluence with the Whitman River, Fitchburg	2.7-0.0	B	NS	Dissolved oxygen Suspended solids Nutrients, Aesthetics	Landfill leachate
Whitman River	6.7-0.0	B	PS	Coliform bacteria	Point sources Surface runoff
Phillips Brook	8.0-0.0	B	PS	Coliform bacteria	Point sources Surface runoff
Monoosnuc Brook, downtown Leominster segment only	1.5-0.0	B	PS	Coliform bacteria	Point sources Surface runoff
Fall Brook	3.0-0.0	B	PS	Coliform bacteria	Surface runoff
Still River	3.1-0.0	B	PS	Coliform bacteria Dissolved oxygen	Surface runoff Natural conditions
Catacoonamug Brook	2.0-0.0	B	S	--	--
Nonacoicus Brook	1.5-0.0	B	S	Dissolved oxygen	Natural conditions
Squannacook River	14.3-0.0	B	S	--	--
James Brook	4.4-0.0	B	PS	Coliform bacteria	Surface runoff Septic systems
Nissitissit River	4.5-0.0	B	S	--	--

Miles Assessed: 101.3 mi
Miles Supporting Classification: 34.1 mi
Miles Partially Supporting Classification: 47.2 mi

NEPONSET RIVER BASIN

Nonpoint Source Conditions

Water quality is generally poor in the Neponset River. Nonpoint sources of pollution are a significant problem in much of the basin. Nonpoint sources include malfunctioning sewer systems, urban runoff, subsurface systems, and in place sediments.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Lake Massapoag, Sharon	353	Surface runoff
Neponset Reservoir, Foxborough	268	Surface runoff Sediment
Pinewood Pond, Stoughton	24	Surface runoff

NEPONSET RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Neponset River					
Neponset River from Neponset Reservoir, Foxborough to Dorchester Bay, Quincy	29.5-0.0	B	NS	Coliform bacteria Dissolved oxygen Shellfish ban	Surface runoff Sewer system Leakages
*Tributary to School Meadow Brook, Rte. 95 to confluence	0.7-0.0	B	PS	Priority pollutants	Surface runoff
Mother Brook					
Mother Brook Dam, Dedham to confluence with Neponset River, Boston	3.1-0.0	B	NS	Coliform bacteria Nutrients	Surface runoff Sewer system Leakages

Miles Assessed: 32.6 mi
Miles Supporting classification: 0 mi
Miles Partially Supporting Classification: 24.7 mi

*Evaluated

NORTH COASTAL DRAINAGE BASIN

Nonpoint Source Conditions

Nonpoint pollution sources within the North Coastal Drainage area are due in the urbanized portions mainly to storm water runoff from street drains and impervious surfaces (roads and parking lots). Rain events flush animal wastes, oil and grease, heavy metals and other pollutants into receiving waters. Elevated coliform bacteria counts and nutrients levels seen in rural and residential areas of the drainage area are most likely due to nonpoint sources of pollution such as faulty subsurface septic systems in the unsewered areas, road runoff, and runoff from agricultural/farm areas. Periodic elevated bacteria counts in the inner harbors of the area may also be the result of waste discharges from boat holding tanks.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Brown's Pond, Peabody	26	Surface runoff
Chebacco Lake, Hamilton	209	Septic systems
Flax Pond, Lynn	71	Surface runoff
Floating Bridge Pond, Lynn	8	Surface runoff
Lake Quannapowitt, Wakefield	250	Surface runoff
Sluice Pond, Lynn	50	Surface runoff

NORTH COASTAL DRAINAGE BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Waters River from headwaters to confluence with Danvers River, Danvers	2.0-0.0	SB	PS	Coliform bacteria Heavy metals	Sediments Unknow
Headwaters Crane Brook to Mill Pond, Danvers	3.9-1.6	B	NS	Coliform bacteria Metals	Unknown Landfill upstream
Crane River from Mill Pond to Danvers River, Danvers	1.6-0.0	SB	NS	Coliform bacteria Metals and PAH's	Sediments Unknow
Porter River from Frost Fish Brook to confluence with Danvers River, Danvers	1.5-0.0	SB	PS	Coliform bacteria Metals and PAH's	Sediments Unknow
Goldthwait Brook from Cedar Pond to North River, Peabody	3.3-0.0	B	NS	Coliform bacteria Metals, Nutrients D.O., PAH's PCB's	Landfill, Former Tanneries Sediments
North River from confluence of Goldthwait Brook and Proctor Brook to confluence with Danvers River, Salem	2.7-0.0	SB	NS	Coliform bacteria Metals, Oil and grease D.O., Nutrients PAH's PCB's	Sediments Unknown
*Coastline from Revere Beach, Revere to Gloucester Harbor, Gloucester	--	SA/SB	NS	Coliform bacteria Shellfish ban	Unknown

NORTH COASTAL DRAINAGE BASIN (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Bass River, from headwaters to confluence with Danvers River, Beverly	3.7-0.0	B	PS	Coliform bacteria Heavy metals and PAH's	Surface runoff Sediments
Danvers River from source to mouth	1.9-0.0	SB	PS	Coliform bacteria Heavy metals and PAH's	Surface runoff Sediments
Forest River, Salem	0.5-0.0	SB	PS	Coliform bacteria Heavy metals and PAH's	Unknown Surface runoff Sediment
Essex River from source to mouth	4.9-0.0	SA	PS	Coliform bacteria	Septic systems Boats
Annisquam River from source to mouth	3.6-0.0	SA	PS	Coliform bacteria Shellfishing restricted	Boats, Point sources Surface runoff
Saugus River from source to mouth	8.6-0.0	SB	NS	Coliform bacteria Dissolved oxygen Metals	Unknown
Pines River from source to mouth	6.4-0.0	SB	NS	Coliform bacteria	Unknown
Essex Bay	1.15 mi^2	SA	U	Coliform bacteria	Surface runoff, Boats
*Blackwater River, Salisbury from headwaters to NH border	--	SA	U	Coliform bacteria	Septic systems

SEGMENT DESCRIPTION	SQUARE MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Rockport Harbor	0.019 mi^2	SB	U	Shellfish ban	Unknown, Point sources
Gloucester Harbor	2.24 mi^2	SB	PS	Coliform bacteria Oil and grease, D.O. PCB's, PAH's	Point sources Boats, Surface runoff Sediments
Manchester Harbor	0.29 mi^2	SB	PS	Coliform bacteria Shellfish ban	Boats, Polluted tributary water
Beverly Harbor	0.78 mi^2	SB	S	Heavy metals Shellfish ban	Point sources, Sediments Surface runoff
Salem Harbor	1.62 mi^2	SB	PS	Heavy metals, Coliform bacteria, PAH's Shellfish ban	Polluted tributaries Point sources, Boats Sediments
Marblehead Harbor	0.56 mi^2	SA	S	Coliform bacteria Shellfish ban	Boats, Illegal sewer tie-ins, Surface runoff, Storm sewers
Lynn Harbor	6.67 mi^2	SB	PS	Coliform bacteria Shellfish ban	Point sources Surface runoff
Nahant Bay	5.27 mi^2	SA	PS	Coliform bacteria Shellfish ban	Point sources Surface runoff
Salem Sound	10.01 mi^2	SB	PS	Coliform bacteria Shellfish ban	Point sources Surface runoff

Miles Assessed: 43.0 mi
Miles Supporting Classification: 0.0 mi
Miles Partially Supporting Classification: 20.4 mi

Square Miles Assessed: 27.44 mi^2
Square Miles Supporting Classification: 1.34 mi^2
Square Miles Partially Supporting Classification: 26.10 mi^2
*Evaluated

PARKER RIVER BASIN

Nonpoint Source Conditions

Nonpoint sources provide pollutant flows to the Parker River. As the river flows through several rural towns, it is subject to runoff and septic tank leachate. Neither of these water quality impacts are considered serious; hence, the river meets its assigned classification.

Analysis of the estuarine portion of the river has shown moderate dissolved oxygen and bacterial standards violations. It is projected that the causes are natural, probably the saltwater marsh influence and thus, this portion is listed as meeting its classification.

PARKER RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Parker River					
Its source in Boxford to Central Street, Newbury	22.0-9.0	B	S	Dissolved oxygen	Natural conditions
Central Street, Newbury to its mouth at Plum Island Sound, Newbury	9.0-0.0	SA	S	Dissolved oxygen Total coliform bacteria Shellfish ban	Natural conditions
Plum Island Sound	--	SA	PS	Coliform bacteria Shellfishing restricted	Unknown

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Miles Assessed: 22.0 mi
Miles Supporting Classification: 22.0 mi
Miles Partially Supporting Classification: 0 mi

QUINEBAUG RIVER BASIN

Nonpoint Source Conditions

The major nonpoint source contamination in the Quinebaug River is from urban runoff as the river flows through Sturbridge and Southbridge and from in-place sediments in the West Dudley Impoundment below the Southbridge WWTP; faulty septic systems also contribute.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Big Alum Lake, Sturbridge	189	Surface runoff Septic systems
Cedar Pond, Sturbridge	146	Surface runoff Septic systems
Hamilton Reservoir, Holland	413	Surface runoff Septic systems
Prindle Pond, Charlton	71	Surface runoff Septic systems
Walker Pond, Sturbridge	94	Surface runoff

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Quinebaug River					
Above Sturbridge WWTP, Sturbridge	30.7-19.1	B	S	--	--
Quinebaug River from Sturbridge WWTP to Southbridge WWTP	19.1-12.2	B	S	Coliform bacteria Solids, Phosphorus	Point sources Septic systems
Southbridge WWTP to West Dudley Impoundment, Dudley	12.2-10.2	B	PS	Coliform bacteria Nutrients, D.O.	Urban runoff Sediments Point sources
West Dudley Impoundment to MA/CT state line	10.2-7.9	B	S	--	--
Cady Brook	6.1-0.0	B	NS	Coliform bacteria Dissolved oxygen Solids, Phosphorus	Point sources
Mill Brook	4.3-0.0	B	S	--	--
Wales Brook	4.9-0.0	B	S	--	--
*Tributary to State Line Pond, CT from headwater, Monson to MA/CT state line	3.0-1.8	B	-	Nutrients, D.O., Solids Coliform bacteria	Surface runoff

Miles Assessed: 38.1 mi
Miles Supporting Classification: 31.0 mi
Miles Partially Supporting Classification: 2 mi

SHAWSHEEN RIVER BASIN

Nonpoint Source Conditions

Surface runoff throughout much of the basin contributed elevated nutrient levels that resulted in increased phytoplankton counts and subsequent diurnal dissolved oxygen fluctuations. Natural dissolved oxygen depletion and increase nutrient concentrations are also associated with wetlands and freshwater marsh. Small wastewater discharges and surface runoff in Andover and South Lawrence caused high coliform bacteria counts.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Fawn Lake, Bedford	11.5	Surface runoff Septic systems
Pomps Pond, Andover	17	Septic systems

SHAWSHEEN RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Shawsheen River					
Shawsheen River from Maguire Road to Spring Brook, Bedford	25.0-23.3	B	NS	Dissolved oxygen Coliform bacteria	Surface runoff
Spring Brook to Horn Bridge, Andover	23.3-5.9	B	PS	Coliform bacteria Dissolved oxygen	Surface runoff Natural conditions
Horn Bridge to confluence with Merrimack River, Lawrence	5.9-0.0	B	PS	Coliform bacteria Dissolved oxygen	Surface runoff

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Miles Assessed: 25.0 mi
Miles Supporting Classification: 0 mi
Miles Partially Supporting Classification: 23.3 mi

SOUTH SHORE DRAINAGE BASIN

Nonpoint Source Conditions

Surface runoff has caused elevated coliform counts in French Stream, Rockland. Surface disposal in Hanover contributes coliform and nutrients to the Indian Head impoundment in Hanover. In the estuary, the most significant sources of the elevated coliform counts are storm drains, especially those flowing during dry weather and subsurface disposal. Additional sources are septage disposal and watercraft sanitary discharges. Failing septic systems in Marshfield and in the Rocky Neck area in Kingston contribute to elevated coliform counts in the Green Harbor River and the Jones River estuary respectively.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Bartlett Pond, Plymouth	32	Surface runoff Septic systems
Billington Sea, Plymouth	269	Surface runoff Septic systems
Little Sandy Bottom Pond, Pembroke	62	Surface runoff
Oldham Pond, Pembroke	235	Surface runoff

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Cohasset Harbor, Cohasset	0.83 mi^2	SA	PS	Coliform bacteria Nutrients Shellfish ban	Point sources, Wetlands, Surface runoff
Scituate Harbor, Scituate	0.31 mi^2	SA	PS	Coliform bacteria shellfish ban	Point sources Unknown
North River					
Weymouth Naval Air Station to inlet Studleys Pond, Rockland	20.6-18.9	B	NS	Coliform bacteria	Surface runoff
Studleys Pond to Rockland WWTP, Rockland	18.9-17.0	B	PS	Coliform bacteria Dissolved oxygen Phosphorus	Surface runoff, Wetlands
Rockland WWTP to outlet Factory Pond, Hanover	17.0-14.0	B	S	Dissolved oxygen Phosphorus	Wetlands runoff, Natural conditions
Outlet Factory Pond to Curtis Crossing Dam, Hanover-Pembroke	14.0-11.6	B	PS	Coliform bacteria Dissolved oxygen Nutrients	Wetlands, Septic Systems, Point sources
Curtis Crossing Dam to Third Herring Brook, Hanover	11.6-9.6	SB	PS	Coliform bacteria Dissolved oxygen	Wetlands, Surface runoff, Septic systems
Third Herring Brook, Hanover, to Rte. 3A, Scituate	9.6-2.0	SA	NS	Coliform bacteria	Septic systems Illegal septage disposal, Surface runoff
Rte. 3A, Scituate to Mouth	2.0-0.0	SA	PS	Coliform bacteria Shellfish ban	Upstream sources Boats, Septic systems

SOUTH SHORE DRAINAGE BASIN (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
First Herring Brook					
Outlet, Old Oaken Bucket Pond, Scituate to Simm's Marina	4.0-2.2	SA	NS	Coliform bacteria	Septic Systems Surface runoff
Simm's Marina to North River	2.2-0.0	SA	PS	Nutrients, Coliform bacteria	Point sources, Boats Septic Systems
South River					
Above Main Steet, Marshfield	10.6-6.7	B	S	--	--
Main Street to Bourne Park Ave., Marshfield	6.7-4.6	SA	NS	Coliform bacteria Dissolved oxygen	Septic systems Surface runoff Wetlands
Bourne Park Ave. to Mouth	4.6-0.0	SA	PS	Coliform bacteria Dissolved oxygen Shellfish ban	Septic Systems Wetlands
Green Harbor River, Marshfield	2.5-0.0	B	PS	Dissolved oxygen, Nutrients, Coliform bacteria, Shellfish ban	Wetlands, Septic systems
Jones River to Elm Street, Kingston	7.0-2.5	B	S	Dissolved oxygen	Wetlands
Jones River estuary, Kingston	2.5-0.0	SA	PS	Coliform bacteria Shellfish ban	Point sources Septic systems Surface runoff
Duxbury Bay, Kingston	13.46 mi^2	SA	PS	Coliform bacteria Shellfish ban	Surface runoff Septic systems

SOUTH SHORE DRAINAGE BASIN (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES/AREA	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Plymouth Harbor, Plymouth	2.61 mi^2	SA	PS	Coliform bacteria Shellfish ban	Point sources Storm sewers
Plymouth Bay, Plymouth	--	SA	S	--	--
Bound Brook, Source to outlet Hunter Pond, North Scituate	4.6-0.0	B	S	--	--
Gulf River, outlet Hunter Pond to Cohasset Harbor	2.4-0.0	SA	S	--	--

Miles Assessed: 51.7 mi
Miles Supporting Classification: 18.4 mi
Miles Partially Supporting Classification: 20.1 mi

Square Miles Assessed: 17.21 mi^2
Square Miles Supporting Classification: 12.86 mi^2
Square Miles Partially Supporting Classification: 4.35 mi^2

STONY BROOK BASIN

Nonpoint Source Conditions

Surface runoff in Westford, adjacent wetlands, and impoundments contribute to dissolved oxygen depletion and increased nutrient concentrations. Surface runoff and failing septic systems contributes to elevated coliform bacteria counts in Chelmsford.

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Beaver Brook					
Wolf Swamp, Mill Brook, Mill Pond at Route 110-2A, Littleton	17.5-15.6	B	NS	Dissolved oxygen Coliform bacteria Nutrients	Wetlands Impoundments Point sources
Route 110-2A Forge Pond to Stony Brook at Concord Road, Route 225, Westford	15.6-10.3	B	PS	Dissolved oxygen Coliform bacteria Nutrients	Wetlands Impoundments Point sources Surface runoff
Stony Brook					
Concord Road Route 225, to Chamberlin Road, Westford	10.3-3.3	B	PS	Dissolved oxygen Coliform bacteria	Wetlands, Surface runoff
Chamberlin Rd., Westford to mouth, Merrimack River	3.3-0.0	B	NS	Coliform bacteria	Surface runoff Point sources Septic systems

Miles Assessed: 17.5 mi
Miles Supporting Classification: 0.0 mi
Miles Partially Supporting Classification: 12.3 mi

SUDBURY AND CONCORD RIVER BASINS

Nonpoint Source Conditions

The most important nonpoint source in the Sudbury River is in-place sediments which contain mercury and other metals. Mercury laden sediments cover the river bottom from the impoundments in Framingham to the Colonna Dam in Saxonville and have resulted in metal accumulation in fish flesh. PAH's and PCB's are also present in low concentrations in the sediment. Other nonpoint sources which include surface runoff and on-site wastewater disposal result in elevated coliform counts after rainfall. Specific locations include houses near the Framingham and Wayland town line and surface runoff and on-site wastewater treatment in unsewered areas of Concord.

The Concord River occasionally experiences dissolved oxygen variations on the upper section due to its extensive travels through the wetlands. This is a natural condition and cannot be corrected.

River Meadow Brook, the major tributary to the Concord River experiences severe water quality violations due to failing septic systems. The town of Chelmsford has always relied on on-site disposal systems. The soil is not adequate to treat the wastes and thus the brook has received high fecal coliform (>1000 org/100 ml) nutrient and chloride concentrations.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Bartlett Pond, Northborough	45	Surface runoff Septic systems
Lake Boon, Hudson	175	Septic systems
Chauncy Lake, Westborough	177	Surface runoff Septic systems Wetlands
Lake Cochituate, Natick	594	Surface runoff
Dudley Pond, Wayland	84	Septic systems
Fort Meadow Reservoir, Hudson	284	Surface runoff
Long Pond, Littleton	88	Surface runoff Septic systems
Walden Pond, Concord	58	Surface runoff
Waushakum Pond, Ashland	81	Surface runoff Septic systems

SUDBURY AND CONCORD RIVER BASINS

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Sudbury River					
Headwaters in Westborough to inlet to Reservoir No. 2, Ashland	32.7-23.2	B	PS	Fecal coliform bacteria	Surface runoff
Inlet to Reservoir No. 2, Ashland to Saxonville Pond, Framingham	23.2-16.2	B	NS	Metals Fecal coliform bacteria	Sediments, Surface runoff
Saxonville Pond outlet to confluence with Assabet River, Concord	16.2-0.0	B	PS	Dissolved oxygen, Fecal coliform bacteria	Septic systems Wetlands
Hop Brook					
Marlborough WWTP discharge to Stearns Pond	9.7-5.5	B	NS	Dissolved oxygen Nutrients	Point sources
Stearns Pond to confluence with Sudbury River, Wayland	5.5-0.0	B	PS	Fecal coliform bacteria Nutrients	Surface runoff Upstream sources
Concord River					
Confluence of the Assabet and Sudbury Rivers to the Billerica WWTP outfall, Billerica	15.4-6.1	B	S	Dissolved oxygen Nutrients	Upstream sources Wetlands
Billerica WWTP to Lowell Canal, Lowell	6.1-0.3	B	PS	Coliform bacteria	Point sources
Lowell Canal to confluence with Merrimack River, Lowell	0.3-0.0	B	NS	Coliform bacteria	Point sources
River Meadow Brook					
Russell Millpond to confluence with Concord River, Lowell	6.1-0.0	B	NS	Coliform bacteria	Septic systems

Miles Assessed: 63.9 mi
Miles Supporting Classification: 9.3 mi
Miles Partially Supporting Classification: 37.0 mi

Nonpoint Source Conditions

Nonpoint sources are limited to surface runoff in Brockton and effects the Salsbury River, Trout Brook, and Beaver Brook; stormwater in East Bridgewater which also effects Beaver Brook, failing septic systems in Freetown which effects the Assonet River, and surface runoff in Bridgewater and Taunton which slightly impacts the Taunton River.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Ames Long Pond, Stoughton	65	Surface runoff Septic systems
Furnance Pond, Pembroke	100	Surface runoff
Lake Mirimichi, Plainville	170	Septic systems
Monponsett Pond, Halifax	528	Surface runoff Septic systems
Norton Reservoir, Mansfield	529	Surface runoff
Stetson Pond, Pembroke	93	Surface runoff
Sweet's Pond, Mansfield	18	Surface runoff Septic systems
Turnpike Lake, Plainville	115	Surface runoff Septic systems Landfill leachate

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Taunton River from the confluence of the Town and Matfield Rivers to Route 24 bridge, Taunton	40.8-21.2	B	PS	Dissolved oxygen Coliform bacteria Nutrients	Surface runoff Point sources
Route 24 bridge, Taunton to the Berkley Bridge, Dighton	21.2-13.0	SB	PS	Dissolved oxygen Coliform bacteria	Upstream sources Point sources
Berkley Bridge, Dighton to Fall River city line	13.0-7.5	SB	PS	Dissolved oxygen Coliform bacteria Shellfish ban	Unknown
Fall River city line to the mouth in Mount Hope Bay, Fall River	7.5-0.0	SB	PS	Coliform bacteria	Point sources
Matfield-Salisbury Rivers from Prospect Street, Brockton to confluence with the Town River, Bridgewater	53.3-40.8	B	PS	Dissolved oxygen Coliform bacteria Nutrients	Septic systems Surface runoff
Trout Brook from Route 28, Avon to confluence with the Salisbury Plain River, Brockton	4.0-0.0	B	PS	Dissolved oxygen Coliform bacteria	Surface runoff
Beaver Brook from Groveland St. to confluence with the Salisbury Plain River, East Bridgewater	5.5-0.0	B	PS	Dissolved oxygen Coliform bacteria	Wetlands Surface runoff
Satucket-Shumatusacacant Rivers from Central St., Abington to confluence with the Matfield River, East Bridgewater	14.4-0.0	B	S	Dissolved oxygen	Wetlands

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Town - Hockomock Rivers from the confluence of Queset and Coweeset Brooks, West Bridgewater to Bridgewater WWTP	11.7-1.7	B	S	Dissolved oxygen	Wetlands
Bridgewater WWTP to confluence with Matfield River	1.7-0.0	B	PS	Dissolved oxygen Coliform bacteria	--
Robinson Brook from Cocasset Street, Foxborough to confluence with Rumford River, Foxborough	3.0-0.0	B	PS	Dissolved oxygen Nutrients, Coliform bacteria	Wetlands Point sources
Rumford/Threemile Rivers from headwaters to confluence with Taunton River, Dighton	18.4-0.0	B	PS	Dissolved oxygen Coliform bacteria	Point sources
Wading River from Spruce Street, Foxborough to confluence with Threemile River, Norton	11.3-0.0	B	S	--	--
Segreganset River from Center St., Dighton to confluence with the Taunton River, Freetown.	2.5-0.0	B	PS	Dissolved oxygen Coliform bacteria Shellfish ban	Unknown
Assonet River from Route 74, Freetown to confluence with Taunton River, Freetown	6.0-0.0	B	PS	Dissolved oxygen Coliform bacteria	Wetlands Septic systems
Assonet Bay, Freetown	--	B	S	Coliform bacteria Shellfish ban	Unknown
Queset Brook from outlet of Longwater Pond, Easton to confluence with Coweeset Brook, West Bridgewater	2.8-0.0	B	S	--	--

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Coweeset Brook from Pearl Street, Brockton to confluence with Queset Brook, West Bridgewater	3.6-0.0	B	S	--	--
Winnetuxet River from Route 58 to confluence with Taunton River, Halifax	6.7-0.0	B	S	Dissolved oxygen Nutrients/Pesticides	Wetlands Surface runoff
Nemasket River from Vaughan Street, Middleborough to Plymouth Street bridge	10.5-3.5	B	S	Dissolved oxygen Nutrients/Pesticides	Surface runoff
Plymouth Street bridge to confluence with the Taunton River, Middleborough	3.5-0.0	B	PS	Dissolved oxygen Fecal coliform bacteria	Surface runoff
Canoe Snake Rivers from Cocasset Street, Foxborough to outlet of Lake Sabbatia, Taunton	18.2-3.1	B	S	--	Surface runoff
Mill River from outlet of Lake Sabbatia, Taunton to confluence with Taunton River, Taunton	3.1-0.0	B	PS	Dissolved oxygen Coliform bacteria	Point sources
Muddy Cove Brook from outlet of pond, North Dighton to confluence with Taunton River, North Dighton	0.8-0.0	B	PS	Coliform bacteria Nutrients	Septic systems

Miles Assessed: 172.7 mi
Miles Supporting Classification: 70.7 mi
Miles Partially Supporting Classification: 102.0 mi

TEN MILE RIVER BASIN

Nonpoint Source Conditions

The Ten Mile River, mainly urban in nature, is subject to problems typically associated with urban river systems. The deliniation of the nonpoint problems has been difficult due to the preponderance and domination of point sources to the Ten Mile River.

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Ten Mile River					
Headwaters in Plainville to inlet W. Bacon Street, Plainville	20.7-19.8	B	S	--	--
W. Bacon Street, Plainville to N. Attleborough WWTP, Attleboro	9.8-15.5	B	PS	Coliform bacteria Eutrophication Toxicity	Surface runoff Point sources Sediments
N. Attleborough WWTP to Attleboro WWTP, Seekonk	15.5-7.6	B	PS	Coliform bacteria Dissolved oxygen Eutrophication, Toxicity	Surface runoff Point sources Sediments
Attleborough WWTP to confluence with Seekonk River, East Providence, R.I.	7.6-0.0	B	PS	Eutrophication Toxicity	Surface runoff Point sources
Speedway Brook					
Headwaters to confluence with Ten Mile River, Attleboro	0.9-0.0	B	NS	Coliform bacteria Dissolved oxygen Aesthetics, Toxicity	Surface runoff Point sources
Bungay River					
Headwaters to confluence with Ten Mile River, Attleboro	4.0-0.0	B	S	Dissolved oxygen	Natural wetland influence
Seven Mile River					
Headwaters to Orrs Pond outlet, Attleboro	6.0-3.0	A	S	--	--
Orrs Pond to confluence with Ten Mile River, Attleboro	3.0-0.0	B	PS	Metals in fish	Surface runoff

Miles Assessed: 31.6 mi
Miles Supporting Classification: 7.9 mi
Miles Partially Supporting Classification: 14.9 mi

WESTFIELD RIVER BASIN

Nonpoint Source Conditions

Nonpoint pollution due to agriculture runoff, septic system failures and domestic fertilizers is a problem affecting lakes throughout the basin. Significant areas of regional aquifers in Southwick have been contaminated by pesticides such as EDB and Temik. Road salt runoff has contaminated numerous wells in Goshen and Cummington. A landfill has contaminated a future well site in Chester. Silvicultural runoff is a suspected but undocumented nonpoint source.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Congamond Lake, Southwick	450	Surface runoff Septic systems
Hampton Pond, Westfield	UNK	Septic systems
Pequot Pond, Westfield	154	Surface runoff Septic systems

WESTFIELD RIVER BASIN

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
West Branch Westfield River					
Source in Becket to confluence with main stem Westfield River, Huntington	17.5-0.0	B	S	--	--
Middle Branch Westfield River - Source in Peru to Littleville Dam, Huntington	18.1-1.0	A	S	--	--
Littleville Dam to confluence with main stem Westfield River, Huntington	1.0-0.0	B	S	--	--
Mainstem Westfield River					
Source in Savoy to confluence with West Branch, Huntington	62.5-25.1	B	S	--	--
From confluence with West Branch to Rte. 202 Bridge, Westfield	25.1-12.3	B	S	--	--
Rte. 202 Bridge to Agawam town line	12.3-7.8	B	PS	Coliform bacteria	Point sources Septic systems
Agawam town line to confluence with CT River, West Springfield	7.8-0.0	B	NP	Coliform bacteria	Point sources

WESTFIELD RIVER BASIN (CONTINUED)

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Little River From Horton's Bridge to confluence with Westfield River, Westfield	4.7-0.0	B	NS	Coliform bacteria	Point sources Surface runoff Septic systems
Powdermill Brook from confluence with Arm Brook to confluence with Westfield River, Westfield	3.2-0.0	B	S	--	--

Miles Assessed: 106.0 mi
Miles Supporting Classification: 89.0 mi
Miles Partially Supporting Classification: 3.5 mi

WEYMOUTH AND WEIR RIVER BASINS

Nonpoint Source Conditions

The Weymouth & Weir River Basin is impacted by typical urban nonpoint source input such as failing septic systems. The paucity of data does not allow the determination of the exact causes of the contamination.

LAKE/POND	AREA (ACRES)	SOURCE OF PROBLEMS
Foundry Pond, Hingham	8	Surface runoff
Lake Holbrook, Holbrook	32	Surface runoff
Straight's Pond, Cohasset	UNK	Surface runoff
Whitman's Pond, Weymouth	210	Surface runoff

SEGMENT DESCRIPTION	RIVER MILES	WATER USE CLASSIFICATION	SUPPORT STATUS	WATER QUALITY PROBLEMS	SOURCE OF PROBLEMS
Weymouth Fore River from Mary Lee Brook at Union St. to Mukusea St., Braintree	12.4-5.1	B	NS	Dissolved oxygen Coliform bacteria	Surface runoff Septic systems
Weymouth Fore River from Mukusea St. to Hingham Bay, Weymouth-Quincy	5.1-0.0	SB	PS	Coliform bacteria	Surface runoff Septic systems
Weymouth Back River from Whitmans Pond to Fresh River, Weymouth	6.1-3.2	B	S	--	--
Weymouth Back River from the Fresh River to Hingham Bay, Weymouth-Hingham	3.2-0.0	SB	PS	Coliform bacteria	Surface runoff Septic systmes
Weir River from outlet Straits Pond in Hingham to Hingham Bay	0.9-0.0	SB	PS	Dissolved oxygen	Point sources
Town River: Old Quincy Reservoir to Rte. 3A, Quincy	4.7-1.5	SB	NS	Coliform bacteria	Surface runoff Leaking sewers
*Cochato River from Cochato River Industrial Park to confluence with Lee Brook, Randolph	3.3-2.5	B	PS	Priority Pollutants	Surface runoff Superfund site

Miles Assessed: 13.4 mi
Miles Supporting Classification: 2.9 mi
Miles Partially Supporting Classification: 0.0 mi
*Evaluated

DWPC GROUNDWATER DISCHARGE PERMITS

BASIN	TOWN	APPLICANT	FLOW(gpd)
Blackstone	Paxton	Anna Maria College	30,000
Buzzards Bay	Buzzards Bay	Capeway Reality	31,600
Cape Cod	Mashpee	Field Point Estates	165,000
Cape Cod	Harwich	Shorey Concrete	262
Cape Cod	Sandwich	K.W.E.	9,600
Cape Cod	Falmouth	Falmouth DPW	-
Cape Cod	Brewster	Seasons of the Cape	43,465
Cape Cod	Truro	Exxon Service Station	-
Cape Cod	Sandwich	Army Nationa Guard	-
Cape Cod	Dennisport	Automatic Coin Laundry	20,000
Cape Cod	Orleans	Septage Treatment	45,000
Cape Cod	Yarmouth	Mill Creek Cove	39,000
Cape Cod	Bourne	Bourne Laundromat	-
Cape Cod	Falmouth	Seacrest Hotel	45,000
Cape Cod	Mashpee	Pine Hill Estates	150,000
Cape Cod	Yarmouth	King's Way	39,000
Cape Cod	Yarmouth	Mayflower Place	25,000
Cape Cod	Provincetown	Acme Speed Wash	7,200
Cape Cod	Harwich	Snow Inn	80,000
Charles	Needham	Southland Corp.	-
Charles	Hopkinton	Indian Brook Condo.	32,400
Charles	Boston	Cohen Prop.	5,000
Charles	Weston	Regis College	60,000
Chicopee	Barre	Quabbin Plaza	3,000
Ipswich	Reading	Exxon Co.	43,700
Ipswich	Middleton	Bostik	19,000
Ipswich	Ipswich	Ipswich Country Club	75,000
Islands	Oak Bluffs	M.V. Hospital	22,000
Islands	Nantucket	Surfside WWTP	180,000
Islands	Nantucket	Siasconset WWTP	260,000
Merrimack	Chelmsford	Patricia Drive	39,000
Merrimack	Westford	Hildreth Realty Trust	44,700
Merrimack	Andover	Colonial Drive	21,300
Merrimack	Tyngsborough	Browning-Ferris	28,800
Nashua	Ayer	Tulco Inc.	-

DWPC GROUNDWATER DISCHARGE PERMITS (Continued)

BASIN	TOWN	APPLICANT	FLOW(gpd)
Neponset	Norwood	FMP corp.	-
Neponset	Walpole	Old Colony Petroleum	7,200
Neponset	Randolph	Old Colony Petroleum	21,600
Neponset	Canton	reliable Electronics	-
Neponset	Stoughton	Ark-Les Corp.	5,000
North Coastal	Lynnfield	Lynnfield Porsche	100
North Coastal	Wakefield	Old Colony Petroleum	7,200
Quinebaug	Sturbridge	Weir Stewart	37,000
South Shore	Hanover	Earl Simmons	4,000
South Shore	Kingston	Town & Country San.	44,200
South Shore	Plymouth	Vo-Tech High	864,000
South Shore	Plymouth	Summer Hill	48,970
South Shore	Plymouth	White Cliffs	80,000
South Shore	Hanover	Hanover Mall	56,000
South Shore	Scituate	Driftway Auto Wash	2,477
Sudbury/Concord	Littleton	Chiachia Trust	7,200
Sudbury/Concord	Chelmsford	TBG Development	118,000
Sudbury/Concord	Chelmsford	Mascester Co.	15,000
Sudbury/Concord	Acton	Keystone	71,000
Sudbury/Concord	Acton	Nagog Woods	150,000
Sudbury/Concord	Littleton	Nordblom Co.	30,000
Sudbury/Concord	Hopkinton	Seragen	5,000
Sudbury/Concord	Acton	Great Road Aprt.	27,700
Sudbury/Concord	Stow	Digital	30,000
Sudbury/Concord	Concord	Nuclear Metals	302,400
Taunton	Attleboro	Texas Instruments	-
Taunton	Halifax	Mary King Plaza	10,400
Taunton	Carver	Carver High	30,000
Taunton	Easton	Stane Pony Realty	31,000
Taunton	Abington	Mobil Oil Station	24,720
Taunton	Easton	Southland Corp.	7,200
Ten Mile	Attleboro	Leach & Garner	28,800
Weymouth	Hingham	Brandon Woods	62,000
Weymouth	Braintree	Old Colony Petroleum	7,200

DWPC TYPE III DISCHARGE PERMIT AREAS

Falmouth Wastewater Treatment Plant

Orleans Septage Treatment Facility

Surfside Wastewater Treatment Plant (Nantucket)

Siasconset Wastewater Treatment Plant (Nantucket)

CONCENTRATION OF SODIUM IN PUBLIC WATER SUPPLIES

NORTHEAST DISTRICT 1987 (mg/l)

CITY/TOWN	SAMPLING LOCATION	1st	2nd	3rd	4th	Ave
AMESBURY	Tap in Town Hall	10	10	13	13	12
ANDOVER	Tap in Town Hall	27	23	22	30	25
BEVERLY	Tap in City Hall	17	17	19	21	19
BILLERICA	Tap in Town Hall	37	43	44	46	43
BURLINGTON	Tap in Town Hall	49	38	46	46	45
BYFIELD	Tap in Town Hall	16	12	19	21	17
CAMBRIDGE	Tap in City Hall	45	47	60	62	54
CHELMSFORD NO.	Tap in Town Hall	72	100	110	97	95
EAST CHELMSFORD	Tap in Town Hall	51	80	87	62	70
CENTER CHELMS.	G. P. WELL #2	27	21	42	41	32
DANVERS	TAP IN TOWN HALL	20	14	19	21	19
HAVERHILL	TAP IN CITY HALL	26	26	28	31	25
HAMILTON	TAP IN TOWN HALL	13	13	16	13	14
IPSWICH	TAP IN TOWN	19	19	21	17	19
LOWELL	TAP ON SYSTEM	12	12	15	18	14
LYNN	TAP IN CITY HALL	23	20	21	30	24
LYNNFIELD	TAP IN CITY HALL	20	20	19	18	19
MANCHESTER	TAP IN TOWN HALL	14	26	14	15	17
METHUEN	BON SECOURS TAP	13	*	N.R.	N.R.	13
NEWBURYPORT	TAP IN CITY HALL	39	22	19	21	25
NO. READING	TAP IN TOWN HALL	25	22	26	28	25
N.R. REHAB.CENT.	TAP IN ADMIN. BLDG.	N.R.	N.R.	N.R.	N.R.	N.R.
PEABODY	TAP IN WATER DEPT. OFFICE	20	16	23	18	19
READING	TAP IN TOWN HALL	N.R.	59	76	47	61

*Temporarily shut off...

CONCENTRATION OF SODIUM IN PUBLIC WATER SUPPLIES

NORTHEAST DISTRICT 1987 (mg/l)

CITY/TOWN	SAMPLING LOCATION	1st	2nd	3rd	4th	Ave
ROCKPORT	TAP IN TOWN HALL	11	16	23	24	19
ROWLEY	TAP IN TOWN HALL	N.R.	16	14	30	20
SALEM	TAP IN CITY HALL	17	16	19	21	18
SALISBURY	TAP IN WATER CO. OFFICE	49	45	30	57	45
TEWKSBURY	TAP IN TOWN HALL	27	18	19	29	23
TEWKS.STATE HOS.	TAP IN ADMIN. BLDG.	32	28	25	20	26
EAGLE TRUST TOPSFIELD	TAP IN SYSTEM	14	14	14	18	15
TOPSFIELD	TAP IN TOWN HALL	17	12	15	13	14
WEST NEWBURY	TAP IN TOWN HALL	33	22	20	27	25
WILMINGTON	TAP IN TOWN HALL	46	42	39	45	43
WOBURN	TAP IN CITY HALL	41	36	49	49	44
WEST NEWBURY	PENTUCKET REGIONAL H.S.	N.R.	N.R.	20	27	23

CONCENTRATION OF SODIUM IN PUBLIC WATER SUPPLIES

METROPOLITAN DISTRICT 1987 (mg/l)

CITY/TOWN	SAMPLING LOCATION	1st	2nd	3rd	4th	Ave
ASHLAND	TAP IN TOWN HALL	18	19	17	20	19
BRAINTREE	TAP IN TOWN HALL	35	29	30	34	32
COHASSET	TAP IN TOWN	17	13	15	16	15
DOVER	TAP IN TOWN HALL	83	62	86	39	68
DOVER	WATER CO.TAP ON SYSTEM	16	22	26	22	22
DOVER	MEADOW BROOK TRUST	22	18	19	28	22
HINGHAM	TAP IN TOWN HALL	17	18	21	10	17
HOLBROOK	TAP IN TOWN HALL	28	25	24	29	27
MEDFIELD STATE HOSPITAL	TAP ON SYSTEM	27	23	29	30	27
MEDFIELD	TAP IN TOWN HALL	20	22	24	32	25
MILLIS	TAP IN TOWN HALL	15	7.5	8.7	9.1	10
NATICK	TAP IN TOWN HALL	44	28	48	44	41
NEEDHAM	TAP IN TOWN HALL	15	16	17	21	17
RANDOLPH	TAP IN TOWN HALL	36	23	24	31	29
WALPOLE	TAP IN TOWN HALL	N.R.	N.R.	27	N.R.	27
WELLESLEY	TAP IN PUBLIC WORKS BLDG.	28	30	37	39	34
WELLESLEY COLL.	TAP IN OFFICE	21	30	49	34	34
WEYMOUTH	TAP ON SYSTEM	52	67	59	69	62
WESTWOOD	TAP IN TOWN HALL	N.R.	64	67	82	71
DEDHAM	TAP IN TOWN HALL	29	25	28	27	27
HULL	TAP IN TOWN HALL	34	16	21	13	21

CONCENTRATION OF SODIUM IN PUBLIC WATER SUPPLIES

SOUTHEAST DISTRICT 1987 (mg/l)

CITY/TOWN	SAMPLING LOCATION	1st	2nd	3rd	4th	Ave
ABINGTON-ROCKLAND	TAP IN ABINGTON	60	24	53	51	47
ABINGTON-ROCKLAND	TAP IN ROCKLAND	30	29	27	28	29
ATTLEBORO	TAP IN WATER DEPT. CO.	47	43	50	50	48
AVON	TAP IN TOWN HALL	63	53	48	67	58
BROCKTON	TAP IN CITY HALL	20	21	23	24	22
GOSNOLD	TAP IN CUTTY HUND ELEM.SCH.	18	16	15	19	17
HALIFAX	TAP IN TOWN HALL	16	19	19	24	20
HANOVER	TAP IN TOWN HALL	40	37	48	44	42
MIDDLEBOROUGH	TAP IN CENTRAL F.S.	11	13	14	35	18
NO.ATTLEBORO	TAP IN HOME FOR AGED	39	28	41	37	36
NORWELL	TAP IN CENTRAL F.S.	37	25	46	49	39
PEMBROKE	TAP IN TOWN HALL	24	15	20	17	19
PLAINVILLE	TAP IN TOWN OFFICE	43	29	42	30	36
PROVINCETOWN	TAP IN TOWN HALL	27	19	23	22	25
SCITUATE	TAP IN TOWN HALL	40	24	36	40	35
W.BRIDGEWATER	TAP IN TOWN HALL	12	10	19	25	17
WHITAMN	TAP IN CENTRAL F.S.	23	19	18	54	29
SCHOOL WRENTHAM STATE	TAP IN ADMIN. BLDG.	16	16	20	N.R.	17

CONCENTRATION OF SODIUM IN PUBLIC WATER SUPPLIES

CENTRAL DISTRICK 1987 (mg/l)

CITY/TOWN	SAMPLING LOCATION	1st	2nd	3rd	4th	Ave
ACTON	TAP IN TOWN HALL	24	18	22	27	23
ATHOL	TAP IN TOWN HALL	18	20	22	29	22
AUBURN	TAP IN TOWN HALL	N.R.	N.R.	N.R.	N.R.	---
BOYLSTON	TAP IN WATER DEPT OFFICE	15	17	20	21	18
DUNSTABLE	TAP IN TOWN HALL	7.5	7.7	7.9	8.5	8
FORT DEVENS	TAP IN HDQTRS. BLDG.	43	12	9.1	12	19
GRAFTON	TAP IN TOWN HALL	29	26	29	29	28
HARVARD	TAP ON SLOANE RES.	20	18	19	17	19
HOPKINTON	FIRE STA. MAIN ST.	23	20	19	20	21
HUDSON	TAP IN TOWN	3.8	16	4.5	4.2	7
MARLBORO	TAP IN CITY GARAGE	26	20	12	13	18
MEDWAY	TAP IN TOWN HALL	17	16	19	25	19
MILFORD	TAP ON SYSTEM	28	14	19	25	22
MILLBURY	TAP IN TOWN HALL	95	65	82	84	82
OXFORD	TAP IN TOWN HALL	24	8.5	19	26	19
SHREWSBURY	TAP IN TOWN HALL	27	22	23	34	27
STOW	JUNIPER HILL,TIMBER RIDGE RD.	20	18	23	21	21
STURBRIDGE	TAP IN TOWN HALL	13	15	15	13	14
SUTTON (MANCHAUG)	TAP ON SYSTEM	23	26	19	20	22
WEST WARREN	COLLIN'S GAS STATION	3.9	3.7	4.5	4.6	4
WESTBORO	TAP IN TOWN HALL	36	17	9.8	16	20
WESTFORD	TAP IN TOWN HALL	18	N.R.	N.R.	22	20

CONCENTRATION OF SODIUM IN PUBLIC WATER SUPPLIES

WESTERN DISTRICT 1987 (mg/l)

CITY/TOWN	SAMPLING LOCATION	1st	2nd	3rd	4th	Ave
BELCHERTOWN W.D.	TAP IN TOWN HALL	25	20	20	21	22
BELCHERTOWN STATE SCHOOL	TAP IN ADMIN. BLDG.	11	12	11	13	12
BRIMFIELD HOUSING	TAP ON SYSTEM	30	31	27	32	30
GREENFIELD	TAP IN TOWN	4.5	7.5	4.7	15	8
ORANGE	TAP IN WATER OFFICE	11	8.2	10	10	10
MILLERS FALLS	MONTAGUE, TAP	58	58	25	11	38

DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING
DIVISION OF WATER SUPPLY

PUBLIC WATER SUPPLIES WHICH HAVE BEEN CLOSED DUE TO CONTAMINATION

SUMMER 1986

MUNICIPALITY	TYPE OF W.S. SYSTEM	BASIN	SOURCE CLOSED	ESTIMATED YIELD	% OF TOTAL SUPPLY	CLOSURE	CONTAMINANTS	HOW CONTAMINATION DISCOVERED	SOURCE	TREATMENT, CLEANUP AND REGULATORY RESPONSES	PRESENT STATUS
ACTON	Municipa	Assabet	5 wells Assabet #s 1 & 2	1.0 mgd	40%	December 1978 - Acton Water District	Trichloroethylene 1,1 dichloroethylene Benzene Toluene Methylchloride Total volatile organics 175 ppb	Testing for new water supply prompted quality sampling.	"Improper industrial storage" W.R.Grace Company	Town initiated hydrogeologic study; got an alternative supply from existing emergency well; and is looking into a new well site. There is a pilot treatment plant using GAC and aeration. Project was selected for participation in 208 program to identify sources; install an interceptor well; and install GAC.	Wells #1 & 2 on line with activated carbon treatment. Air stripping Chlorination Flouridation
			Clapp Well	0.4 mgd	27%	Acton Water District 7/21/82	Trichlorofluromethane 111 trichloroethylene Benzene	Routine sampling	Unknown	Back on-line w/activated carbon treatment; chlorination, fluoridation since 1984	On-line; used only as needed
			Scribners Well; Lawsbrook Well	.35 mgd .35 mgd		Acton Water District 2/22/84	Organics exceeded 1 ppb	Routine sampling	Unknown	Scribners closed since 4/85 Lawsbrook currently pumped to waste	Closed
AMHERST	Municipa	Connecticut	Brickyard wellfield.	0.04 mgd	6.1%	February 1981 DEQE	Acetone 234 ppb Tetrachloroethylene 10.2 ppb	1980-DEQE found elevated levels of contaminants in closest observation well to landfill, wirmed	Leachate from landfill & auto prts.bus.	Town has developed zoning bylaws for watershed protection and aquifer recharge protection district;	On reserve by order of DEQE

MUNICIPALITY	TYPE OF W.S. SYSTEM	BASIN	SOURCE CLOSED	ESTIMATED YIELD	% OF TOTAL SUPPLY	CLOSURE	CONTAMINANTS	HOW CONTAMINATION DISCOVERED	SOURCE	TREATMENT, CLEANUP AND REGULATORY RESPONSES	PRESENT STATUS
AMHERST (CONTINUED)			(11 driven wells 30-40' deep)				Trichloroethylene 4.2 ppb 1,1,1 trichloroethane 4.7 ppb 1,2 dichloroethylene 7.3 ppb 1,1 dichloroethane 2.2 ppb Methylene-chloride 5.5 ppb	town DPW & recommended quarterly monitoring. Town and DEQE have conducted monitoring since 1970.		and fuel storage regulations. Closure of landfill in process - to be completed early 1986.	
ASHLAND	Municipa	Concord and Sudbury	3 wells (Sudbury River wells)				Iron Manganese		Natural sources		Abandoned development of Spring St. well possible with treatment
AUBURN	Public Water District	Blackstone	1 well Church St. #2	0.25 mgd	10%	1972 - Auburn Water District	Sodium - 130 ppm	Routine testing	Mass. Turnpike salt runoff	District now receives water from other existing wells	On reserve with DEQE approval
BARNSTABLE	Municipa		Mary Dunn Well #3			1986 Barnstable Water Co.	Potential for contamination from petroleum		Fire school approx. 1900' away		Well is not currently in use although it

MUNICIPALITY	TYPE OF W.S. SYSTEM	BASIN	SOURCE CLOSED	ESTIMATED YIELD	% OF TOTAL SUPPLY	CLOSURE	CONTAMIN-ANTS	HOW CONTAMINATION DISCOVERED	SOURCE	TREATMENT, CLEANUP AND REGULATORY RESPONSES	PRESENT STATUS
BARNSTABLE (CONTINUED)											is not actually contaminated. Contamination highly likely if pumping were to be continued. Barnstable Water Co. has determined that sufficient water is available from other sources to supply the community.
BEDFORD	Municipal	Shawsheen	4 wells; Turnpike wells #7,8,9 and well #3(mitre well) (3 wells in 1 aquifer; 1 well in another)	Turnpike - 1.45 mgd #3-0.5 mgd	80%	May 1978 DEQE	Dioxane Trichloroethylene 1,2 dichloroethane	Accidently by town resident who took water samples	TCE-leaking sewer line and overflows from an industry's emergency septic tank system. Dioxane-local industry.	Town instituted a water usage ban; a change in water charges to an ascending block rate; purchased water from neighboring towns (Lexington, Billerica and Concord). The town also pursued legal action against industries to recover costs. In August 1983 town was awarded 2.5 mil.	Wells monitored by DEQE on a weekly basis after closure on Aug. 21, 1981. DEQE approved Well #3 back on line ('83) w/weekly monitoring

MUNICIPALITY	TYPE OF W.S. SYSTEM	BASIN	SOURCE CLOSED	ESTIMATED YIELD	% OF TOTAL SUPPLY	CLOSURE	CONTAMIN-ANTS	HOW CONTAMINATION DISCOVERED	SOURCE	TREATMENT, CLEANUP AND REGULATORY RESPONSES	PRESENT STATUS
BEDFORD (CONTINUED)										dollars to be paid to the town over the next 10 years. A general bylaw for hazardous materials and subsurface fuel storage was enacted in 1981. Granted funds under C.286 in 1985 to study state of-the-art treatment techniques to decrease volatile organics in Turnpike wells.	& evidence of all organics are below health advisories
		Shaw-sheen	VA Hospital wells(2)						Unknown		
	Municipa	Shaw-sheen	Hartwell Rd.wells 10,11,12	.82 mgd		1983	High iron sulfates, volatile organics		Monitoring wells installed -source not confirmed	Wells were developed in 1982 to provide water after 3,7,8,9 were closed; 10,11, 12 later found to be contaminated	Closed
BRAINTREE	Municipa	Weymouth	Lakeside Drive	.3 mgd	10%	by Water Commissioner	NaCl	Routine testing	Road salt from Rt. 128		No public well used since 1970's

MUNICIPALITY	TYPE OF W.S. SYSTEM	BASIN	SOURCE CLOSED	ESTIMATED YIELD	% OF TOTAL SUPPLY	CLOSURE	CONTAMIN-ANTS	HOW CONTAMINATION DISCOVERED	SOURCE	TREATMENT, CLEANUP AND REGULATORY RESPONSES	PRESENT STATUS
BROCKTON	Municipa	Taunto	Avon-Brockto Reser-voir	1 mgd	20%	Pre-1965 DEQE & Brockton Water De-partment	Urban run-off, high nitrates, phosphates	Routine testing	Non-point overde-velopment of water-shed area	Brockton applied to the 206 program but was not selected. A recommendation was made to apply to the 406 Water Supply Filtration Plant Program. The reservoir is located in Avon and Brockton has no con-trol over watershed Bond to pump water from Brook stream (2 mgd) to Silver Lake.	Still closed - town is actively seeking to reopen Currently receiving water fro Silver Lake
BURLINGTON	Municipa	Shaw-sheen	Wells 3,4, 5	1.6 mgd	26%	May 1979 Burling-ton DPW; June 1979 DEQE	Trichloro-ethylene-up to 800 ppb have been sampled. Other VOCs-	Special tests taken by consultant trying to find out about Bedford's contanina-tion problem	Northwest Indus-trial Park sew-er syste	The town was awarde 286 funding for hy-drogeologic study and a chap.406 grant to fund treatment for organic chemi-cals and convention-al plant design. Phase 1 Groundwater Treat.Pl. scheduled for 6/86 operation. The Town is pursuin legal actions to re-cover costs and has developed a water resource & aquifer recharge zoning bylaw.	Wells still closed

MUNICIPALITY	TYPE OF W.S. SYSTEM	BASIN	SOURCE CLOSED	ESTIMATED YIELD	% OF TOTAL SUPPLY	CLOSURE	CONTAMINANTS	HOW CONTAMINATION DISCOVERED	SOURCE	TREATMENT, CLEANUP AND REGULATORY RESPONSES	PRESENT STATUS
BURLINGTON (CONTINUED)	Municipa	Shawsheen	Wells 6 & 9 and Sandy Brook Rd. wel			1976	Iron and manganese		natural sources		
CANTON	Municipa	Neponset	2 wells- 1 municipal well, #7	0.5 mgd 1.0 mgd	16%	Municipa well - 5/25/79, DEQE	Trichloroethylene	Special Testing - 2 wells in Dedham, Westwood, were found contaminated - DEQE investigated wells for Canton	Unknown	Canton applied for 206 program, but was not funded because contaminant levels are within standards -Funds provided in line item to discover source of contaminant. Canton is supplied 1/3 of its water needs by MDC and has implemented a hazardous materials bylaw	Well #7 still closed, but contaminant concentration now within our guidelines and could be reopened.
CHELMSFORD	Municipa		River-neck well #1	.5 mgd		1975 DEQ	Trichloroethylene	Routine testing	Unknown	Well was pumped to waste for several months until contaminant levels droppe	Reopened 1975 with regular monitoring

MUNICIPALITY	TYPE OF W.S. SYSTEM	BASIN	SOURCE CLOSED	ESTIMATED YIELD	% OF TOTAL SUPPLY	CLOSURE	CONTAMIN-ANTS	HOW CONTAMINATION DISCOVERED	SOURCE	TREATMENT, CLEANUP AND REGULATORY RESPONSES	PRESENT STATUS
DANVERS	Municipa	Ipswich	1 well, #1	0.2 mgd	6%	May 1979, DEQE	Trichloro-ethylene 28.6 ppb	Spot Program	Unknown	The town requested removal of the restriction in 1980 when the guidelines changed to 10 ppb The water is mixed at the treatment plant before delivery and is 10 ppb trichloroethylene	Concentrations below standards & restriction was lifted in 1982 - wells are now sampled annually
DARTMOUTH	Municipa	Buzzards Bay	2 wells, 1 well Rte. 6	0.5 mgd	23%	April '79 DEQE	Chloroform, 4.4 ppb; dichloro-ethylene, 1.5 ppb	Special testing following illegal disposal in area		The town has purchased water from New Bedford and is attempting to recover costs through lawsuits. Granted 286 funds to determine nature, extent and movement of contaminated groundwater The dumpsite has been cleaned up and Aquifer Protection Dist. adopted	Recovery of Rte.6 well is not recommended at this time. Additional problems with iron and manganese
			1 well-Chase Road	0.5 mgd	23%	Never pumped	Waste oil & fish oil	Resident informed town that materials were dumped yrs. ago. Backhoe brought in to excavate area. Samples taken	Illegal dumping	Fish oil removed; waste oil will be removed by town in cooperation with Southeast Region	Town is still not using either well for water supply

MUNICIPALITY	TYPE OF W.S. SYSTEM	BASIN	SOURCE CLOSED	ESTIMATED YIELD	% OF TOTAL SUPPLY	CLOSURE	CONTAMIN-ANTS	HOW CONTAMINATION DISCOVERED	SOURCE	TREATMENT, CLEANUP AND REGULATORY RESPONSES	PRESENT STAIUS
DEDHAM/ WESTWOOD	Privately owned public water supply	Upper Charles	2 wells; Dedham Water Company wells #3 & #4 White Lodge Wells (Same aquifer as Canton)	2.5 mgd	30%	March '79 Dedham Water May 1979 DEQE	Trichloro-ethylene - 300 ppb 780 ppb	Private water Co. doing annual testing decided to test for VOC's as well since they were found in neighboring water supplies	Unknown	An emergency water ban was enacted. A pilot study in 1980 showed air stripping as a cost-effective mechanism to treat the contamination. A hydrogeologic study of the aquifer in the region was recommended. Legislative grant provided to allow DEQE to conduct study to determine source. Other options are installing new wells; joining MDC; or increased pumping of their other wells. Closed Wells #3 + 4 pumped to waste at total of 1 mgd. Treatment plant under construction by Dedham Water Co.	Monthly testing is conducted by the Water Co.
	Municipa	Upper Charles	Cutler Park #2			1983 DEQE	Iron, manganese, NaC and others	1983 data tested wel for possible use by town. Well previously used by surrounding communities	Gardner landfill closed 1943	Well tested 1983 as a possible alternative to the White Lodge wells. Showed unacceptable water quality	

MUNICIPALITY	TYPE OF W.S. SYSTEM	BASIN	SOURCE CLOSED	ESTIMATED YIELD	% OF TOTAL SUPPLY	CLOSURE	CONTAMIN-ANTS	HOW CONTAMINATION DISCOVERED	SOURCE	TREATMENT, CLEANUP AND REGULATORY RESPONSES	PRESENT STATUS
DIGHTON	Municipa	Taunto	1 well field-Somerset Avenue	0.175 mgd	14%	November 1980-DEQE	Tetrachloro-ethylene - 59.7 ppb and other hydro-carbons	Spot Program	Indus-trial waste discharge in area	Emergency water bans were enacted. A sanitary survey was conducted to determine the source. The town proceeded with a lawsuit and the case was settled out of court. Cedar St. (well #3) developed. Provides 50% water supply (300-350 gpm)	Closed - transfer of 3.3 acres around well field to non-water supply purposes
DRACUT	Municipa	Merri-mack	2 wells: Trout Brook well and McNaharc well			1933	Iron		Natural sources		Closed
						1960	Sewage		Unknown		Closed
EDGARTOWN	Private Company well	Island basin	Machaket	1.0 mgd	35.9%	DEQE - fall '83	#2 fuel oil	Company had no hot water. Discovered that fuel tank was empty prematurely; smelled fuel oil which had leaked out	Office heating fuel tank	Leak discovered in 6/83; continued to pump well until DEQE order it closed. Investigation made to determine if any fuel oil had reached the water table. However, no contamination discovered in aquifer; well reopened with monitoring in March 1984.	On-line with monitoring since 198

MUNICIPALITY	TYPE OF W.S. SYSTEM	BASIN	SOURCE CLOSED	ESTIMATED YIELD	% OF TOTAL SUPPLY	CLOSURE	CONTAMIN-ANTS	HOW CONTAMINATION DISCOVERED	SOURCE	TREATMENT, CLEANUP AND REGULATORY RESPONSES	PRESENT STATUS
FALMOUTH	Municipal	Cape Cod	1 well-Ashumet well	1 mgd	6.6%	July '79-DEQE	Boron; Detergents	U.S.G.S. study	Otis Air Force Base Sewage Treatment Plant 7,500' upgradient	The town is proceeding to explore new sources of water. The town was awarded funds in 286 program to determine the feasibility of pumping the Ashumet well at a lower rate and siphoning from 2 wells outside the influence of the plume to maintain the level of supply. The hydrogeologic study revealed organic contamination in addition to Borons and MBA's, nitrates that were previously known to exist. It was determined that shallow pumping would not be an appropriate solution. Southeast Reg. recommended that well not be used. The plume is ½ mile wide, 75' thick & 11,000 ft. long. Town has enacted a water resource protection bylaw	Closed

MUNICIPALITY	TYPE OF W.S. SYSTEM	BASIN	SOURCE CLOSED	ESTIMATED YIELD	% OF TOTAL SUPPLY	CLOSURE	CONTAMIN-ANTS	HOW CONTAMINATION DISCOVERED	SOURCE	TREATMENT, CLEANUP AND REGULATORY RESPONSES	PRESENT STATUS
GLOUCESTER	Municipa	North Coasta R.Basin	Fernwood Lake well				Turbidity & color problems				Closed - emergency use only
GROVELAND	Municipa	Merri-mac	Stations wells #1 and #2	1.2 mgd	100%	#1, May '79-DEQE #2, Sept. 1979-DEQE	Trichloro-ethylene #1 - 118 ppb #2 - 108 ppb	Spot Program	Indus-trial waste Superfund site	The town enacted emergency water use restrictions and increased its water rate 50%. The town initially purchased water from Haverhil and then developed a new well using HUD funds. The town is pursuing legal action against the source. They have also received 286 funding for study and treatment. EPA instituted intermediate remedial measures to treat water and to put in distribution system if water quality is acceptable.	Well #1 is closed Well #2 is closed
LEICESTER	Privately owned public water supply. Hillcrest Wat.Dist.	French & Quin-ebaug	1 well-Rock Well #2 (Hill-crest Country Club)	.0864 mgd	33%	May 1976-DEQE	Gasoline Hydrocarbons	Taste, odor complaint	Presumed leaky gasoline tank	Cleaned up by Chap-man wells as soon as sources was discovered	Opened immed-iately af-ter clean-up

MUNICIPALITY	TYPE OF W.S. SYSTEM	BASIN	SOURCE CLOSED	ESTIMATED YIELD	% OF TOTAL SUPPLY	CLOSURE	CONTAMIN-ANTS	HOW CONTAMINATION DISCOVERED	SOURCE	TREATMENT, CLEANUP AND REGULATORY RESPONSES	PRESENT STATUS
LOWELL	Municipa	Merri-mack	2 wells Hadley Field	1.3 mgd		DEQE, 1964	Poor water quality	Routine testing	Municipal landfill		Closed
	Municipa	Merri-mack	Off Rte. 113			1960's	Iron, manganese	Taste & odor problems	Natural sources		Closed
	Municipa	Merri mack	Off River Meadow Brook near Lowell Connector (3 wells)				Sulfur and taste problems		Natural sources		Closed
	Municipa	Merri-mack	4 wells Wood St.			1960's	Poor water quality		Natural sources		Closed
MARSHFIELD	Municipa		Furnace Brook wells 1, 2, & 3; South River Street well	1.4 mgd	25%	8/1986 - Board of Public Works	Furnace Br. #1-29 ppb tetrachloroethylene Furnace Br. #2-6.3 ppb tetrachloroethylene Furnace Br. #3-4.26 ppb benzene South River St. well-5.3 ppb tetrachloroethylene	DEQE testing	Unknown	Board of Public Works has voted to hire a hydrologist to identify the source of contamination	All 4 wells are closed

MUNICIPALITY	TYPE OF W.S. SYSTEM	BASIN	SOURCE CLOSED	ESTIMATED YIELD	% OF TOTAL SUPPLY	CLOSURE	CONTAMIN-ANTS	HOW CONTAMINATION DISCOVERED	SOURCE	TREATMENT, CLEANUP AND REGULATORY RESPONSES	PRESENT STATUS
MILLIS	Municipa	Upper Charles	2 wells Well #1; Well #2	0.72 mgd 0.58 mgd	30%	Aug. 1983 Millis BOH	Carbontetrachloride - Well #1,1.4 ppb Well #2,3.5 ppb	Special testing due to concern for organics	Unknown	The town enacted water use bans; purchased water from Medway and Medfield and is exploring for a new well site Contamination study of wells #1 and #2 underway. Well #4 on-line in 1985.	Wells #1 & 2 closed. Either may be used as an emergency source
NEWBURYPORT	Municipa	Parker	Newburyport well (Spring Lane)				Turbidity		Natural sources		Used only in extreme emergency
NORTH READING	Municipa	Ipswich	Stickney well	0.5 mgd	30%	Dec. '78-Reading DPW; Jan. 79-DEQE	Trichloroethylene - samples showed 10-900 ppb	Testing done by private consultant - DEQE confirmed	Unknown	The town enacted water use restrictions and 2 new wells were put on line. The town also was selected for participation in 286 funding for monitoring well and groundwater flow analysis to determine sources & treatment	Closed

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NORWOOD	Municipa	Nepon-set	Ellis Well-field; Buck-master Pd. Wel	2.0 mgd 1.0 mgd	65%	Both wells were a-bandoned due to contamin-ation: Buckmas-ter Pond, 1954; El-lis Well-field, 1957	Trichloro-ethylene 1,1,1 tri-chloro-ethane tetrachloro-ethylene Other VOCs	Pre-1960 Ellis wellfield shut down in 1951 - no contamination known of at that time. Tow switched to MDC in the '70's. Town wan-ted to bring wells back on-line. Tests revealed contamina-tion. Town received special line item funds to conduct study to determine sources	Ellis: single SPOT contamin-ation Buckmas-ter over-develop-ment of watershe	Town opted to re-ceive their water from MDC in the late 1950s. Town was selected for participation in 286 program to do a hydrogeologic study on Buckmaster Pond Well and Ellis Well-field In 1980, Norwood re-quested reopening of Buckmaster Pond well. Sampling showed 0.9 mg/l tri-chloroethylene; 68.8 mg/l tetrachloroeth-ylene;1.5 mg/l 1,1,1 trichloroethane. The request was denied. In 1982, town re-quested emergency backup status for Buckmaster. Permis-sion not granted. Now contamination is below acceptable levels; however, re-quest has not been renewed. Pumping water to waste thru Ellis wells in an effort to clean out. MDC has chosen 27 potential well sites for study.	Ellis wellfield closed Buckmaster Pond well closed

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NORWOOD (CONTINUED)	Municipa	Nepon-set	Purga-tory Brook-2 wells								Closed
ONSET (WAREHAM)	Municipa District	Buz-zards Bay & Mt. Hope Bay	1 well-#2	0.5-0.7 mg	61%	1963-BOH & DEQE	Iron, taste, odor prob-lems	Pre-1965 - Taste & odor noticed by property owners	Source of iron thought to be from un-cemented cast iron mains and natural sources. Also possible that over-pumping of well #2 caused Zone II to extend into pro-perty covered by Cran-berry plants	Mains have been up-graded with asbestos cement, cast iron, PVC pipe. Approxi-mately 70% of sys-tem renewed in last 20 years.	Closed-'84 400,000 gal. water pumped to waste. Well #2 remains although tests done at Law-rence Lab. revealed that wat-er quality is more than ade-quate. Wareham lacks funds to put well back on-line.

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PALMER	Municipa	Chicopee	1 well-field-Galaxy Well-field	0.58 mgd	50%	April '80 DEQE closed except on emergency basis May 1981-Palmer Water Dt. closed except for waste pumping	Tetrachloroethylene 1,1,1 Trichloroethane Trichloroethylene	Spot program	Unknown-possibly a solvent in the sewer system or illegal dumping into the Quaboag River upstream	Town enacted an emergency water ban and was selected for participation in the 286 program for contanination source study and industrial survey	Well has been pumped to waste reducing contamination in well, but not below recommended health advisories Well remains closed
PLYMOUTH	Privately owned public water supply, Cedarville Landing Associates	South Coasta	1 well			4/28/'81, DEQE	Tetrachloroethylene 24.9 ppb	DEQE & town testing	Septic system Cedarville landfill	Town allotted $16,500 to pipe town water into private system	Closed
PROVINCETOWN	Municipa	Cape Cod	South Hollow well-field (North Truro)	1.2 mgd	54%	Dec. 197 by Town	Gasoline	Spill discovered at gas station and Water Dept. figured out it would travel to well-field	Underground gasoline storage tank leak	Underground storage tank regulations were adopted by the town. Town was selected for participation in c.286	

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PROVINCETOWN (CONTINUED)										program to pump contaminated water out of the aquifer, treat it and reinject into aquifer. HUD has paid $700,000 towards the cost of a treatment plant. DEQE contributed $1.2 mil. to finish construction and to pay for operation & maintenance. This is the only project of this sort that DEQE will undertake.	
RANDOLPH/HOLBROOK	Joint Municipa	Weymouth	South Street wells; #s 1,2, and 3	1.8 mgd	80%	1980-DEQE	Phenols 1,1,1 trichloroethane 1,1 dichloroethane Benzene Chloroform 1,2 transdichloroethylene	Spot program	Reported industrial spill at Baird & McGuire	Town enacted an emergency water ban. The disposal site is a federal Superfund site and the town was selected for participation in c.286 program for study and possible treatment	Closed

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READING	Municipa	Ipswich	Off Rte. 129 2 wells	.75 mgd	5-7%	1980	NaCl, Iron, manganese; Fe & Mg reduced below minimum by treatment sodium levels ± 60 ppm	Regular testing	State road testing	Treatment with lime, Ferric, aeration, etc. Sodium levels dropped. Wells approved by DEQE.	On-line with treatment April '81
RAYNHAM	Municipa	Taunton	Wells # 1 & 2	1.0 mgd	95%	By DEQE 1983	(Fuel oil #2) Benzene - 34 ppb Butylether 9 ppb	Strong odor and taste	Suspect gas station, but not confirmed	Monitoring by Lawrence Exp. Station. Carbon unit installed '84. Aeration unit installed. Town received water from Bridgewater, 4-8/84.	On-line with activated carbon treatment 8/01/84
ROWLEY	Municipa	Parker	1 well-#2	0.34 mgd	100%	May 1979 DEQE	Trichloro-ethylene	16 ppb found while analyzing for pesticides; rose to 30, & closed; then 74 & continued rising through 1980	A machine shop near well which disposed of a degreasing agent into the septic system	Town enacted a water supply emergency ban and a new well was brought on-line (Well #3). Regulatory controls include locked gates & 24 hour surveillance of the well-field. Project was selected for participation in c.286 program to restore the well by pumping & mixing with other wells to decrease contaminant levels.	Jan. 1983-DEQE agreed to allow Rowley to blend water from Well #2 from water from new well to dilute levels so well will be in use with monitoring

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ROWLEY (CONTINUED)										Before Well #3 was brought on-line, water was purchased from Georgetown.	
SCITUATE	Municipa	North River	1 well #2,Kent Street	0.2 mgd	6%	October 1973, town Water Div.	$CaCO_3$ Chlorides Manganese	Routine testing	Adjacent building demolition landfill	DEQE Regional and Boston office recommended that supply be abandoned. Impractical to recover source.	Closed
SOUTH DEERFIELD		Connecticut River Basin	Sugarloaf well-field	0.5 mgd	10%	DEQE, April '84	Ethylene dibromide 7.8 ppb	Routine testing by DEQE	Agricultural activity	Water Contamination Grant, Ch.286 for hydrogeological study	Closed, April '84 until further notice from DEQE
TEWKSBURY	Municipa	Shawsheen	Well #s 6,7, 8,9,10 11, 12	1.03 mgd	33%	July '82 town DPW and BOH	Closed due to coliform bacteria but also showed elevated levels of phenols, 1,1,1 trichloroethane, trihalomethanes,	Routine testing	Unknown-possible landfill or septic tank density or illegal dumping	Town enacted an emergency ban and purchased water from Lowell & Andover. Was selected for participation in c.286 program for study and monitoring well installation	Wells #8, 9, 11, 12 Closed. Wells #6,7 being used as needed. Well #10 dismantled

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TEWKSBURY (CONTINUED)							iron, magnesium, and tetrachloroethylene				
TYNGSBORO	Privately owned	Merrimac	2 wells-Cannongate	.03 mgd		July 1982 - DEQE	Methyl ethyl ketone Methyl isobutyl ketone Benzene Acetone Other VOCs	Special testing - discoloration, taste, odor in water & requested testing	Landfill	96 un. condo complex is investigating new source of water or hookups to other towns & is trucking in water. The landfill is a Superfund site. C.286 & other funds used to augment supply. Currently piping water from North Chelmsford.	Closed
WALPOLE	Municipal	Neponset	2 wells: Washington St., Wells # 2 & 4	.7 mgd each	19%	Oct. 7, 1983-Town	Diesel fuel	Fuel contamination found in soils at town DPW	Town DPW yard-storage of fuel	Hired consultant to evaluate extent of contamination and implement remedial action. Contaminated soils removed. Area refilled with grave All subsequent tests show acceptable water quality.	Opened May 1984; monitored monthly

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WESTON	Municipa	Upper Charles	3 wells: Nickerson Field; Fitzgerald Well	1.14 mgd	100%	Oct. '72 Weston DPH	Chlorides - 320 ppm	Routine testing	State road salting	Receives 100% water from MDC	Closed
WEST SPRINGFIELD	Municipa	Westfield/ Southwick basin	3 grave packed wells (in Southwick)	5.0 mgd	66%	April '84 by DEQE	Ethylene dibromide	Routine testing by DEQE	Agricultural activities; fumigants containing EDB	Currently buying water from Sringf'l and receiving Ch.20 grant	Closed
WEYMOUTH	Municipa	Weymouth	Main St. well	1.0 mgd	23.4%	Closed 1970 to 1976	Gasoline	Underground leak	Mobile station underground storage tank leak	Pumped to waste as often as practical	Closed for 5 yrs. during 1970s. Now on-line
WILMINGTON	Municipa	Ipswich	Chestnut St. wel	Appx 1.0 mgd ~~200 gpm~~		July '74 by DEQE	1,1,1 trichloroethane 5.3 ppb		Unknown	Water treated at Butter Row Treatment Plant	On-line with treatment
	Municipa	Ipswich	Butters 1 & 2	1.44 mgd		#2 closed 1972	Trichloroethylene 145.3 ppb		Unknown	Water treated at Butters Row Treatment Plant	On-line with treatment

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WILMINGTON (CONTINUED)	Municipa	Ipswich	Barrows Station- 3 wells						Unknown		Closed
	Municipa	Ipswich	Shaw-sheen Ave.- 1 well			July 1984	Bacteria and color		Unknown		Closed
WOBURN	Municipa	Mystic	2 wells G and H	1.75 mgd	24%	May 1979- Woburn DPW, BOH, & DEQE	Trichloro-ethylene (400 ppb) Tetrachloro-ethylene (43 ppb) Chloroform Heavy metals 1,2 trans-dichloro-ethylene 1,1,1 tri-chloro-ethane	Special testing - taste & odor problems in water - testing after illegal dumping discovered	Industrial waste activities and heavy metal dump sites	Town went to MDC for water and enacted an emergency water ban. It is a federal Superfund site and was selected for participation in 286 program for a groundwater flow and treatability study. Remedial investigation underway; hydrogeological study underway to determine extent of contamination and source. Monitoring wells have been installed.	Closed

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WORCESTER	Municipa	Black-stone	1 well	4.0 mgd	14%	March '77 by Worcester DPW	Closed due gastrointes-tinal ill-ness out-break in area. Coli-form count high.	Special testing due to illness in area and subsequent test-ing	Unknown	Recommendation for chlorination. $2.0 million project to separate, correct and enlarge sewers. To be completed '86.	Town work-ing to re-activate well
YARMOUTH	Municipa	Cape Cod	1 well			1973 - Town of Yarmouth	Chlorides - 250 ppm		State salt stockpile 800' fro well	Town enacted a toxi and hazardous mat-erials bylaw. Test-ing still required by DEQE and shows levels of chlorides have decreased. Treatment by Mass. DPW (1973) effectiv in reducing levels.	CLosed

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Quality Engineering

S. Russell Sylva
Commissioner

Division of
Solid Waste

1 Winter Street
Boston, MA 02108

L. James Miller
Director

Division of Solid Waste Management's
Computer Variables Explanation

Last Update: December 1, 1987

contact: Geri Lambert
292-5979

Landfill File

TOWN-	Town name
ADDRESS-	location by street address
REGION- (Reg)	Department of Environmental Quality Engineering regional breakdown W- West C- Central N- Northeast S- Southeast
BOHACRES-	Acres site assigned by the board of health
DEQE ACRES-	Numbers of acres approved by DEQE.
STATUS-	Landfills that accept waste, proposed as future sites or are closed to all types of waste disposal -Active -Inactive (no active dumping, not properly closed and/or capped) -Closed (landfill that has been properly closed and capped) -Proposed
CLOSE-	Projected year landfill runs out of capacity space
COUNTY-	County breakdown on a town by town basis
REFUSE-	Landfills that receive residential and/or commercial waste for disposal -Yes -No

OIL CONT (Oil Cont Soil) — Landfills that receive oil contaminated soil
-Yes
-No

SLUDGE- — Landfills that receive sludge from wastewater treatment facilities
-Industrial
-Municipal
-Both
-No

DEMOLITION- (DEMO) — Landfills that receive demolition debris for disposal
-Yes
-No

ASH- — Landfills that reveive RRF and incinerator ash
-Yes
-No

STUMPS- — Landfills that receive stumps and large brush for disposal
-Yes
-No

WSID- — Division of Water Supply Legrand Classification Number

KIND- — Category of Landfills
-SLF (sanitary landfill)
-SD (stump dump)
-DLF (demo landfill)
-Epic/dump (open space, possible dumping site)
-LF (inactive landfill sited before 1971)
-ILF (illegal landfill)
-WWTP (Waste Water Treatment Plant)
-WWTP/DOS (Treatment Plant where sludge is disposed on site)
-ALF (ash landfill)

TRANS- — Landfills where transfer stations are in operation
-Yes
-No

RECYCLE- — Landfills that have some form of recycling program and/or containers on site

LTPY85- — Tons per year of refuse projected for disposal at a specific landfill in 1985

LTPY86- — Tons per year of refuse projected for disposal at a specific landifll in 1986

LTPY87- — Tons per year of refuse projected for disposal at a specific landfill in 1987

LTPY88- — Tons per year of estimated refuse projected for disposal at a specific landfill in 1988

REGIONAL LANDFILL INFORMATION- PART ONE
LAST UPDATE - FEBRUARY 1, 1988
DEQE-DIVISION OF SOLID WASTE MANAGEMENT
1 WINTER ST. BOSTON, MA. 02108

ID#	TOWN	STATUS	ADDRESS	KIND	CLOSE	BOH ACRES	DEQE ACRES	OWNER	OPER	REG	COUNTY	REFUSE	DEMO	ASH	SLUDGE	STUMPS	OIL CONT SOIL	LTPY 85	LTPY 86	LTPY 87	LTPY 88	LTPY 90
2	ABINGTON	ACTIVE	GROVELAND ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	YES	NO	NO	NO		0	0	0	0	0
5	ACTON	ACTIVE	14 FOREST RD/RTE 2	SLF	1988	18	18	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	YES	NO	NO	NO	NO		12500	12500	12500	12500	0
7	ACUSHNET	INACTIVE	561 N MAIN ST (B&F) (BFI)	SLF	1987	23	24	COMMERCIAL	COMMERCIAL	S	BRISTOL	YES	NO	NO	NO	NO		85000	85000	85000	0	0
9	ADAMS	ACTIVE	273 COLUMBIA ST/EAST RD	SLF/WWTP	1989	7	7	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	YES	NO	NO	MUNICIPAL	NO		12000	13000	13000	13000	0
10	AGAWAM	ACTIVE	BONDIS ISLAND	SLF	1995	100	55	MUNICIPAL	MUNICIPAL	W	HAMPDEN	YES	NO	NO	MUNICIPAL	NO		100000	100000	117000	117000	26280
11	AGAWAM	INACTIVE	MAIN ST (GRASSO)	SLF	0	0	0	COMMERCIAL	COMMERCIAL	W	HAMPDEN	NO	NO	YES	NO	NO		0	0	0	0	0
13	AMESBURY	CLOSED	HUNT RD (TITCOMP PIT-SCA)	SLF	1977	60	0	COMMERCIAL	COMMERCIAL	N	ESSEX	NO	NO	NO	NO	NO		0	0	0	0	0
16	AMESBURY	ACTIVE	RTE 150/ST JOSEPHS CEM (SCA)	SLF	0	0	0	COMMERCIAL	COMMERCIAL	N	ESSEX	NO	YES	NO	NO	NO		0	0	0	0	0
19	AMHERST	ACTIVE	740 BELCHERTOWN RD/RTE 9 (NEW)	SLF	1991	35	22	MUNICIPAL	MUNICIPAL	W	HAMPSHIRE	YES	NO	NO	MUNICIPAL	NO		20000	20000	18200	18200	0
24	ANDOVER	INACTIVE	CHANDLER RD	DLF	0	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	NO	NO	NO	NO	YES		0	0	0	0	0
26	ARLINGTON	INACTIVE	KEATS RD	SLF	1969	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
27	ARLINGTON	INACTIVE	DRAELON RD	SLF	1959	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
28	ARLINGTON	INACTIVE	ARTHUR ST/SUMMER ST	SLF	1987	20	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
29	ARLINGTON	INACTIVE	CONCORD TPK	SLF	1947	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
0	ARLINGTON	INACTIVE	REED RD	SLF	1969	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
31	ARLINGTON	INACTIVE	BERKLEY ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
33	ASHBURNHAM	ACTIVE	RTE 12	SLF	1988	0	32	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		2500	2500	2500	2500	0
36	ASHBY	ACTIVE	GREENVILLE RD	SLF	1988	10	2	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	YES	NO	NO	NO	NO		5500	5500	5500	5500	0
39	ASHFIELD	ACTIVE	BUCKLAND RD/RTE 112	DLF	0	0	0	MUNICIPAL	MUNICIPAL	W	FRANKLIN	NO	YES	NO	NO	YES		0	0	0	0	0
42	ATHOL	ACTIVE	WEST ROYLSTON RD	SLF	1992	9	9	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	MUNICIPAL	NO		7500	7500	7500	7500	7500
43	ATHOL	ACTIVE	JONES ST	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	YES	MUNICIPAL	NO		6	6	6	6	6
44	ATTLEBORO	ACTIVE	PECKHAM ST (ATTLEBORO LF INC)	SLF	1997	56	26	COMMERCIAL	COMMERCIAL	S	BRISTOL	YES	YES	NO	NO	NO		75000	109000	109000	109000	109000
46	AUBURN	ACTIVE	ROCHDALE ST	SLF	1988	23	23	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		16000	16000	16000	16000	0
50	AYER	INACTIVE	WASHINGTON/OLD AYER RD/GROTON RD	SLF	1988	10	10	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	YES	NO	NO	NO	NO		4000	4000	4000	4000	0
51	AYER	ACTIVE	BROOK ST (GRAVEL PIT)	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	NO	NO	NO	MUNICIPAL	NO		0	493	493	493	493
52	AYER	INACTIVE	BLIGH ST	DLF	0	0	0	*	*	C	MIDDLESEX	NO	YES	NO	NO	YES		0	0	0	0	0
53	AYER	ACTIVE	FT DEVONS	SLF	-1	0	0	COMMERCIAL	COMMERCIAL	C	MIDDLESEX	YES	NO	YES	NO	NO		0	0	0	0	0
54	BARNSTABLE	ACTIVE	FLINT ST (MARSTON MILLS)	SLF	1996	61	61	MUNICIPAL	MUNICIPAL	S	BARNSTABLE	YES	YES	NO	MUNICIPAL	NO		40000	40000	40000	40000	40000
57	BARRE	INACTIVE	SUMMER ST/NICHOL RD	SLF	1930	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	NO	NO		0	0	0	0	0
58	BARRE	ACTIVE	DEPOT RD (RES CTROL INC)	SLF	1993	40	4	COMMERCIAL	COMMERCIAL	C	WORCESTER	YES	NO	NO	NO	NO		15500	15500	15500	15500	15500
66	BELCHERTOWN	ACTIVE	HAMILTON ST	SLF	1991	10	10	MUNICIPAL	MUNICIPAL	W	HAMPSHIRE	YES	NO	NO	NO	NO		5000	5000	4200	4200	4200
69	BELLINGHAM	ACTIVE	MAPLE ST	SLF	1989	0	0	MUNICIPAL	MUNICIPAL	C	NORFOLK	YES	NO	NO	NO	NO		8580	8600	8600	8600	0
70	BELLINGHAM	INACTIVE	CENTRE ST/E OF POULAKI HWY	SLF	1973	0	0	MUNICIPAL	MUNICIPAL	C	NORFOLK	NO	NO	YES	NO	NO		0	0	0	0	0
72	BERKLEY	INACTIVE	OLD COUNTY RD (SCA-CALS DUMP)	SLF	1972	0	0	COMMERCIAL	COMMERCIAL	S	BRISTOL	NO	NO	NO	BOTH	NO		0	0	0	0	0
76	BERKLEY	INACTIVE	BRIAN ST	SLF	1970	0	0	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	NO	NO	NO	NO		0	0	0	0	0
77	BERLIN	INACTIVE	BATES POND RD	SLF	1984	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	NO	NO		1500	0	0	0	0
79	BERLIN	INACTIVE	JONES RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		0	0	0	0	0
80	BERNARDSTON	ACTIVE	DEPOT LN/PARMENTER RD/MEBRIFIELD ST	SLF	1991	10	10	MUNICIPAL	COMMERCIAL	W	FRANKLIN	YES	NO	NO	NO	NO		1000	1000	800	800	0
82	BEVERLY	INACTIVE	STANLEY ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	NO	NO	YES	NO	YES		0	0	0	0	0
84	BEVERLY	INACTIVE	BRIMBAL AVE	SLF	1965	40	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		33000	33000	0	0	0
85	BEVERLY	INACTIVE	RTE 97	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		0	0	0	0	0
91	BILLERICA	INACTIVE	POND ST (SHAFFER)	SLF	1967	106	0	COMMERCIAL	COMMERCIAL	N	MIDDLESEX	YES	NO	NO	MUNICIPAL	NO		312000	312000	0	0	0
92	BLACKSTONE	ACTIVE	CHESTNUT ST	SLF	1993	35	35	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		4500	4500	4500	4500	4500
94	BLANDFORD	ACTIVE	HUNTINGTON RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	NO	YES	NO	NO	YES		0	0	0	0	0
95	BOLTON	ACTIVE	FORBUSH MILL RD	SLF	1989	5	5	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		1600	1600	1600	1600	0
96	BOLTON	INACTIVE	114 OLD BAY RD (GRAVEL PIT)	SLF	1971	0	0	*	COMMERCIAL	C	WORCESTER	NO	NO	NO	NO	NO		0	0	0	0	0

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101	BOSTON	INACTIVE	GARDNER ST	SLF	1986	98	0	MUNICIPAL	MUNICIPAL	N	SUFFOLK	NO	NO	NO	NO	NO		0	0	0	0	0
103	BOURNE	INACTIVE	*	SLF	0	0	0	COMMERCIAL	COMMERCIAL	S	BARNSTABLE	NO	NO	NO	NO	NO		0	0	0	0	0
104	BOURNE	ACTIVE	CONNERY RD (OTIS AF BASE)	SLF	-1	0	100	COMMERCIAL	COMMERCIAL	S	BARNSTABLE	YES	NO	NO	NO	NO		0	0	0	0	0
102	BOURNE	ACTIVE	MACARTHUR BLVD/RTE 28 (NEW)	SLF	2005	11	11	MUNICIPAL	MUNICIPAL	S	BARNSTABLE	YES	NO	NO	NO	NO		14500	14500	14500	14500	18000
106	BOXBOROUGH	INACTIVE	CODMAN HILL RD	SLF	1986	0	0	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	YES	NO	NO	NO	NO		2000	2000	0	0	0
108	BOXFORD	ACTIVE	SPOFFORD ST	SLF	1989	47	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		5500	5500	5500	5500	5500
109	BOYLSTON	ACTIVE	MILL HILL RD	SLF	1989	23	6	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		3500	3500	3500	3500	0
110	BOYLSTON	INACTIVE	OLD SOUTH RD	SLF	1952	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		0	0	0	0	0
113	BRAINTREE	CLOSED	IVORY ST (MBTA STAT)	SLF	1986	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	NO	NO	YES	NO	NO		0	0	0	0	0
115	BREWSTER	ACTIVE	RUN HILL RD	SLF	1998	28	16	MUNICIPAL	MUNICIPAL	S	BARNSTABLE	YES	NO	NO	NO	NO		6500	6500	6500	6500	6500
120	BRIDGEWATER	ACTIVE	BEDFORD/COLONIAL DR/RTE 18 (CHUCKRAN)	SLF	1988	50	30	COMMERCIAL	COMMERCIAL	S	PLYMOUTH	YES	NO	NO	MUNICIPAL	NO		9000	9500	9500	9500	0
127	BRIMFIELD	INACTIVE	DUG HILL RD	SLF	1970	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	YES	NO	NO	NO	NO		0	0	0	0	0
128	BROCKTON	INACTIVE	WEST CHESTNUT ST	SLF	1968	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	NO	NO	NO	NO		0	0	0	0	0
129	BROCKTON	ACTIVE	415 THATCHER ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	YES	NO	MUNICIPAL	NO		0	0	0	0	0
131	BROCKTON	ACTIVE	THATCHER ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	YES	NO	NO	NO		0	0	0	0	0
132	BROCKTON	ACTIVE	303 OAK HILL WAY	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	NO	NO	MUNICIPAL	NO		1200	1200	1200	1200	1200
133	BROCKTON	INACTIVE	SKINNER ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
134	BROOKFIELD	ACTIVE	QUABOG ST	SLF	1988	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	YES	NO	NO		150	1500	1500	1500	0
135	BROOKLINE	INACTIVE	815 NEWTON ST	SLF	1975	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	NO	NO	NO	NO	NO		0	0	0	0	0
136	BROOKLINE	INACTIVE	HAMMOND ST	SLF	1975	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	NO	NO	NO		0	0	0	0	0
137	BUCKLAND	ACTIVE	CONWAY RD/HOGAN RD/RTE 112	SLF	1990	15	15	MUNICIPAL	MUNICIPAL	W	FRANKLIN	YES	YES	NO	MUNICIPAL	YES		1000	1000	1300	1300	1300
140	BURLINGTON	INACTIVE	MULLER RD	SLF	1958	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
143	CAMBRIDGE	CLOSED	NEW ST	SLF	1972	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
148	CARVER	ACTIVE	PLYMOUTH ST (RAVENBK FARM)	DLF	0	6	6	COMMERCIAL	COMMERCIAL	S	PLYMOUTH	NO	YES	NO	NO	YES		0	0	0	0	0
151	CARVER	ACTIVE	FEDERAL ST (DISTRICT)	SLF	1999	80	70	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	NO	NO	NO	NO		20000	20000	20000	20000	131400
152	CARVER	CLOSED	RTE 58/GREEN ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	NO	NO	NO	NO		0	0	0	0	0
153	CARVER	INACTIVE	WHITMAN ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
155	CHARLEMONT	INACTIVE	RTE 2/W OF MOHAWK PK	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	FRANKLIN	YES	NO	NO	NO	NO		0	0	0	0	0
157	CHARLTON	ACTIVE	FLINT RD	SLF	1989	24	24	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		4000	4000	4000	4000	0
159	CHATHAM	ACTIVE	SAM RYDER RD/MAIN ST	SLF/WWTP	1996	0	20	MUNICIPAL	MUNICIPAL	S	BARNSTABLE	YES	NO	NO	MUNICIPAL	NO		6200	6200	6200	6200	6200
161	CHELMSFORD	CLOSED	SWAIN RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
163	CHELSEA	INACTIVE	WEBSTER ST	SLF	1956	0	0	MUNICIPAL	MUNICIPAL	N	SUFFOLK	YES	NO	NO	NO	NO		0	0	0	0	0
166	CHESTER	ACTIVE	MIDDLEFIELD RD	DLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	NO	YES	NO	NO	YES		0	0	0	0	0
169	CHICOPEE	ACTIVE	845 BURNETT RD (BFI)	SLF	1991	60	40	COMMERCIAL	COMMERCIAL	W	HAMPDEN	YES	NO	NO	NO	NO		130000	130000	130000	130000	130000
170	CHICOPEE	ACTIVE	LOMBARD RD (PARTIKA)	SLF	1990	120	30	COMMERCIAL	COMMERCIAL	W	HAMPDEN	YES	NO	NO	INDUSTRIAL	NO	YES	208000	218100	26000	26000	151000
171	CHICOPEE	ACTIVE	GRANBY RD	DLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	NO	YES	NO	NO	NO		0	0	0	0	0
173	CHICOPEE	INACTIVE	WESTOVER U.S.A.F. SHERIDAN ST	SLF	0	0	0	COMMERCIAL	COMMERCIAL	W	HAMPDEN	NO	NO	NO	NO	NO		0	0	0	0	0
174	CHILMARK	ACTIVE	TABOR HOUSE RD	SLF	1996	0	0	MUNICIPAL	MUNICIPAL	S	DUKES	YES	NO	NO	NO	NO		780	780	780	780	780
175	CLARKSBURG	ACTIVE	WEST ST	SLF	1989	5	5	MUNICIPAL	MUNICIPAL	W	HAMPSHIRE	YES	NO	NO	NO	NO		1500	1500	1500	1500	0
177	CLINTON	ACTIVE	SOUTH MEADOW RD	SLF	1988	55	55	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	MUNICIPAL	NO		8000	8200	8200	8200	0
179	COHASSET	ACTIVE	CEDAR ST	SLF	1989	20	20	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	NO	NO	NO		7800	7800	7800	7800	0
180	COHASSET	ACTIVE	CROCKER LN/RTE 3A (COH HTS-BFI)	SLF	1994	20	20	COMMERCIAL	COMMERCIAL	N	NORFOLK	YES	YES	NO	NO	NO		78000	78000	78000	78000	78000
186	COLRAIN	ACTIVE	CATAMOUNT RD/RTE 112	SLF	1991	10	10	MUNICIPAL	MUNICIPAL	W	FRANKLIN	YES	NO	NO	NO	NO		1500	1500	1300	1300	1300
187	COLRAIN	INACTIVE	RTE 112 SOUTH/BHD FIRE STAT	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	FRANKLIN	NO	NO	NO	NO	NO		0	0	0	0	0
188	CONCORD	ACTIVE	WALDEN ST/RTE 2/RTE 126	SLF	1995	35	20	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	MUNICIPAL	NO		24000	25000	25000	25000	25000

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189	CONCORD	ACTIVE	BEDFORD ST/113 KEYES RD	WWTP/DDS	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	NO	NO	NO	MUNICIPAL	NO		450	450	450	450	450
191	CONWAY	INACTIVE	CONWAY RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	FRANKLIN	NO	NO	NO	NO	NO		0	0	0	0	0
192	CONWAY	ACTIVE	OLD QUIGLEY HILL RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	FRANKLIN	NO	YES	NO	NO	YES		0	0	0	0	0
195	CUMMINGTON	INACTIVE	NASH RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPSHIRE	NO	YES	NO	NO	YES		0	0	0	0	0
196	DALTON	INACTIVE	GULF RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	YES	NO	NO	NO	NO		0	0	0	0	0
197	DALTON	ACTIVE	WARREN FARM RD/PARK AVE	SLF	1988	27	27	COMMERCIAL	COMMERCIAL	W	BERKSHIRE	YES	YES	NO	MUNICIPAL	NO		300	300	0	0	0
198	DALTON	INACTIVE	HIGH ST	SLF	0	37	37	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	NO	YES	NO	NO		0	0	0	0	0
199	DANVERS	ACTIVE	POPES LANE	SLF	1988	52	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		0	0	0	0	0
201	DANVERS	INACTIVE	ANDOVER ST	SLF	1967	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		0	0	0	0	0
202	DARTMOUTH	INACTIVE	OLD FALL RIVER RD	DLF	0	0	0	MUNICIPAL	MUNICIPAL	S	BRISTOL	NO	YES	NO	NO	NO		0	0	0	0	0
203	DARTMOUTH	INACTIVE	OLD FALL RIVER RD	SLF	0	60	15	COMMERCIAL	COMMERCIAL	S	BRISTOL	YES	NO	NO	NO	NO		0	0	0	0	0
204	DARTMOUTH	PROPOSED	CRAPO HILL	SLF	0	150	150	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	NO	NO	MUNICIPAL	NO		0	0	0	0	0
205	DARTMOUTH	ACTIVE	759 RUSSELL MILLS RD	SLF/WWTP	1986	20	18	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	NO	NO	MUNICIPAL	NO		20000	20700	20700	20700	0
206	DARTMOUTH	INACTIVE	PIGGERY	SLF	0	0	0	COMMERCIAL	COMMERCIAL	S	BRISTOL	YES	NO	NO	NO	NO		0	0	0	0	0
207	DARTMOUTH	INACTIVE	(S SMITH)	SLF	0	0	0	COMMERCIAL	COMMERCIAL	S	BRISTOL	NO	YES	YES	NO	NO		0	0	0	0	0
209	DEDHAM	INACTIVE	WASHINGTON ST	SLF	1976	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	NO	NO	NO		0	0	0	0	0
210	DEERFIELD	ACTIVE	LEE RD/RTE I-91	SLF	1991	15	15	MUNICIPAL	MUNICIPAL	W	FRANKLIN	YES	NO	NO	MUNICIPAL	NO		3000	3050	3900	3900	3900
213	DENNIS	ACTIVE	RTE 134/THEO SMITH RD/RTE 6	SLF	1998	161	0	MUNICIPAL	MUNICIPAL	S	BARNSTABLE	YES	NO	NO	MUNICIPAL	NO		14000	14000	14000	14000	14000
214	DENNIS	INACTIVE	FORMER DUCK/THEO SMITH RD	SLF	0	0	0	COMMERCIAL	COMMERCIAL	S	BARNSTABLE	NO	NO	NO	NO	NO		0	0	0	0	0
215	DIGHTON	ACTIVE	TREMONT ST	SLF	1990	15	15	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	YES	NO	NO	YES		2000	2000	2000	2000	2000
217	DIGHTON	ACTIVE	ELM ST	SLF	2035	12	12	COMMERCIAL	COMMERCIAL	S	BRISTOL	NO	NO	NO	INDUSTRIAL	NO		0	0	0	0	0
219	DOUGLAS	ACTIVE	RIEDELL RD	SLF	1988	18	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		4500	4500	4500	4500	0
222	DOUGLAS	ACTIVE	CHARLES ST	WWTP/DDS	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	MUNICIPAL	NO		30	30	30	30	30
223	DOVER	ACTIVE	POWISETT ST	SLF	1988	8	8	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	NO	NO	NO		3500	3500	3500	3500	0
225	DOVER	INACTIVE	DOVER RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	NO	NO	NO		0	0	0	0	0
228	DUDLEY	ACTIVE	WEST DUDLEY/INDIAN RD (NEW)	SLF	1990	8	5	MUNICIPAL	COMMERCIAL	C	WORCESTER	YES	NO	NO	NO	NO		7400	7400	7400	7400	7400
230	DUDLEY	ACTIVE	LOWER SCHOFFIELD AVE	WWTP/DDS	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	MUNICIPAL	NO		10	10	10	10	10
231	DUNSTABLE	ACTIVE	DEPOT ST	SLF	1988	0	0	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	YES	NO	NO	NO	NO		1000	1000	1000	1000	0
232	DUXBURY	INACTIVE	TREMONT ST	SLF	1977	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	NO	NO	NO	NO		0	0	0	0	0
233	DUXBURY	INACTIVE	MAYFLOWER/TREMONT ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
234	DUXBURY	INACTIVE	NW DUXBURY	SLF	0	0	0	COMMERCIAL	COMMERCIAL	S	PLYMOUTH	NO	NO	NO	INDUSTRIAL	NO		0	0	0	0	0
235	EAST BRIDGEWATER	INACTIVE	BRIDGE ST	SLF	1987	75	20	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	NO	NO	NO	NO		10000	10000	10000	0	10000
237	EAST BRIDGEWATER	ACTIVE	234 THATCHER ST (NORTHERN DISPOSAL-BFI)	SLF	1992	30	25	COMMERCIAL	COMMERCIAL	S	PLYMOUTH	YES	NO	NO	NO	NO	YES	83000	83000	237250	237250	237250
238	EAST BROOKFIELD	ACTIVE	CONNIE MACK RD	SLF	1988	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		1200	1200	1200	1200	0
244	EAST LONGMEADOW	ACTIVE	SOMERS RD/BERNIE AVE	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	NO	YES	NO	NO	YES		0	0	0	0	0
245	EASTHAM	ACTIVE	ORCHARD ST	SLF	-1	9	9	MUNICIPAL	COMMERCIAL	S	BARNSTABLE	YES	YES	NO	NO	YES		0	0	0	0	0
248	EASTHAMPTON	ACTIVE	OLIVER ST	SLF	1988	20	15	MUNICIPAL	MUNICIPAL	W	HAMPSHIRE	YES	YES	NO	MUNICIPAL	YES		16000	16000	13000	13000	0
251	EASTHAMPTON	ACTIVE	90 FERRY ST/43 MAIN ST ?	WWTP/DDS	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPSHIRE	NO	NO	NO	MUNICIPAL	NO		706	706	706	706	706
252	EASTON	INACTIVE	PROSPECT ST	SLF	1987	90	36	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	YES	NO	NO	YES		8500	8500	8500	0	0
258	EASTON	INACTIVE	BAY RD/KINSLEY RD	SLF	1972	0	0	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	NO	NO	NO	NO		0	0	0	0	0
259	EDGARTOWN	ACTIVE	SCHOOL ST/CHAPPAQUIDICK	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	DUKES	NO	NO	NO	NO	NO		0	0	0	0	0
262	EDGARTOWN	ACTIVE	CLEVELAND TOWN RD	SLF	1991	0	0	MUNICIPAL	MUNICIPAL	S	DUKES	YES	NO	NO	MUNICIPAL	YES		2500	2500	2500	2500	2500
263	EDGARTOWN	INACTIVE	SCHOOL ST (CHAPPAQUIDICK)	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	DUKES	NO	NO	NO	NO	NO		0	0	0	0	0
264	EGREMONT	INACTIVE	PHILLIPS RD/BALDWIN HILL RD	SLF	1988	13	13	MUNICIPAL	COMMERCIAL	W	BERKSHIRE	YES	NO	NO	NO	NO		2000	2000	2000	2000	0
268	ERVING	ACTIVE	RTE 2	SLF/WWTP	0	0	0	COMMERCIAL	COMMERCIAL	N	FRANKLIN	NO	NO	NO	INDUSTRIAL	NO		10100	10100	10100	10100	10100

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269	ERVING	ACTIVE	RIVER RD	WWTF/DOS	0	0	0	MUNICIPAL	MUNICIPAL	W	FRANKLIN	NO	NO	NO	MUNICIPAL	NO		225	225	225	225	225
270	ESSEX	INACTIVE	LANDING RD	SLF	1985	14	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		1200	0	0	0	0
271	ESSEX	INACTIVE	BEHD TOWN HALL	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		0	0	0	0	0
272	EVERETT	INACTIVE	*	SLF	1963	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
273	FAIRHAVEN	ACTIVE	BRIDGE ST	SLF	1995	23	23	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	YES	NO	NO	NO		16000	16000	16000	16000	16000
275	FALL RIVER	INACTIVE	(OLD DUMP)	SLF	1968	0	0	MUNICIPAL	MUNICIPAL	S	BRISTOL	NO	NO	YES	NO	NO		0	0	0	0	0
276	FALL RIVER	ACTIVE	JANSEN IND PK (NORTHERN DISPOSAL/BFI)	SLF	1993	136	71	COMMERCIAL	COMMERCIAL	S	BRISTOL	YES	NO	NO	MUNICIPAL	NO		170000	178000	547500	547500	547500
278	FALL RIVER	INACTIVE	ORCHARD ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	NO	NO	NO	NO		0	0	0	0	0
280	FALMOUTH	ACTIVE	THOMAS LANDERS RD	SLF	1991	54	54	MUNICIPAL	COMMERCIAL	S	BARNSTABLE	YES	NO	NO	NO	NO		28500	28500	28500	28500	28500
284	FITCHBURG	INACTIVE	1 COLLIDE PARK AVE	SLF	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		0	0	0	0	0
285	FITCHBURG	INACTIVE	FALULAH RD	SLF	1971	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		0	0	0	0	0
287	FLORIDA	ACTIVE	RTE 2	SLF	0	0	0	*	*	W	BERKSHIRE	NO	YES	NO	NO	YES		0	0	0	0	0
288	FOXBOROUGH	ACTIVE	EAST BELCHER ST	SLF	1993	50	50	MUNICIPAL	MUNICIPAL	S	NORFOLK	YES	NO	YES	NO	YES		8000	8000	8000	8000	8000
289	FRAMINGHAM	ACTIVE	MT WAITTE AVE	ALF	0	0	0	*	*	N	MIDDLESEX	NO	NO	YES	NO	NO		0	0	0	0	0
291	FRAMINGHAM	INACTIVE	OLD GATES RD	ALF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	NO	NO	YES	NO	NO		0	0	0	0	0
292	FRAMINGHAM	CLOSED	RTE 9	ALF	1985	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	NO	NO	YES	NO	NO		0	0	0	0	0
293	FRAMINGHAM	INACTIVE	DUDLEY RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	YES	NO	NO	NO		0	0	0	0	0
296	FREETOWN	INACTIVE	*	ALF	0	0	0	MUNICIPAL	MUNICIPAL	S	BRISTOL	NO	NO	YES	NO	NO		0	0	0	0	0
297	FREETOWN	ACTIVE	RTE 79	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	BRISTOL	NO	NO	NO	NO	NO		0	0	0	0	0
298	FREETOWN	ACTIVE	HOWLAND RD	SLF	1990	10	10	MUNICIPAL	COMMERCIAL	S	BRISTOL	YES	YES	NO	NO	YES		6000	6000	6000	6000	6000
301	GARDNER	ACTIVE	WEST ST/RTE 68	SLF	1990	80	20	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	MUNICIPAL	NO		11500	11900	11900	11900	11900
304	GAY HEAD	ACTIVE	SOUTH RD	SLF	1983	5	0	MUNICIPAL	MUNICIPAL	S	DUKES	YES	NO	NO	NO	NO		300	300	300	300	0
307	GILL	INACTIVE	MAIN ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	FRANKLIN	NO	NO	NO	NO	NO		0	0	0	0	0
308	GLOUCESTER	ACTIVE	WESTERN AVE	SLF	1988	92	59	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	YES	NO	YES	YES		32000	32000	32000	32000	0
310	GOSHEN	ACTIVE	WING HILL RD	SLF	1988	2	2	MUNICIPAL	MUNICIPAL	W	HAMPSHIRE	YES	NO	NO	NO	NO		400	400	400	400	0
311	GOSNOLD	INACTIVE	CUTTYHUNK ISLAND	SLF	1987	0	0	MUNICIPAL	MUNICIPAL	S	DUKES	YES	NO	NO	NO	NO		40	40	40	0	0
312	GRAFTON	INACTIVE	CROSBY ST	SLF	1987	17	7	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	MUNICIPAL	YES		8500	8500	8500	0	0
317	GRANBY	ACTIVE	NEW LUDLOW RD/RTE 122 (PARTIKA)	SLF	1990	60	60	COMMERCIAL	COMMERCIAL	W	HAMPSHIRE	YES	YES	NO	MUNICIPAL	NO		100000	100000	78000	78000	61000
318	GRANVILLE	ACTIVE	WATER ST	SLF	0	0	0	MUNICIAPL	MUNICIPAL	W	HAMPDEN	NO	YES	NO	NO	YES		0	0	0	0	0
320	GREAT BARRINGTON	ACTIVE	SHEFFIELD RD/MERCER RD	SLF	1993	20	20	COMMERCIAL	COMMERCIAL	W	BERKSHIRE	YES	NO	NO	MUNICIPAL	NO		11000	12000	12000	12000	12000
321	GREAT BARRINGTON	ACTIVE	S GOODRICH RD/RTE 7/BENTLEY RD	SLF/WWTP	0	20	20	COMMERCIAL	COMMERCIAL	W	BERKSHIRE	YES	NO	NO	MUNICIPAL	NO		780	780	780	780	780
322	GREENFIELD	ACTIVE	WISDOM WAY	SLF	1989	30	25	MUNICIPAL	MUNICIPAL	W	FRANKLIN	YES	NO	NO	MUNICIPAL	NO		15300	15900	13000	13000	0
324	GROTON	ACTIVE	FLAVELL ST/RTE 40	SLF	1988	57	57	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	YES	NO	NO	NO	NO		6000	6000	6000	6000	0
328	GROVELAND	INACTIVE	YEMMA PROPERTY	SLF	0	0	0	COMMERCIAL	COMMERCIAL	N	ESSEX	YES	NO	NO	NO	NO		0	0	0	0	0
329	HADLEY	ACTIVE	CEMETERY RD/N BRANCH ST	SLF	1988	10	10	MUNICIPAL	MUNICIPAL	W	HAMPSHIRE	YES	NO	NO	NO	NO		2500	2500	2500	2500	0
333	HALIFAX	ACTIVE	27 LAUREL ST (McDONALD BRS-BFI)	SLF	1996	44	44	COMMERCIAL	COMMERCIAL	S	PLYMOUTH	YES	NO	NO	NO	NO		130000	130000	547000	547000	547500
335	HAMILTON	INACTIVE	CHEBACCO RD	SLF	1984	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		0	0	0	0	0
338	HAMPDEN	INACTIVE	RAYMOND RD/PINEWOOD DR	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	NO	NO	NO	NO	NO		0	0	0	0	0
337	HAMPDEN	ACTIVE	CROSS RD	SLF	1988	10	10	MUNICIPAL	MUNICIPAL	W	HAMPDEN	YES	NO	NO	NO	NO		3000	3000	2600	2600	0
341	HANOVER	INACTIVE	RTE 139/ROCKLAND RD	SLF	0	11	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
344	HARDWICK	ACTIVE	PATRILL HOLLOW RD	SLF	1988	5	0	MUNICIPAL	COMMERCIAL	C	WORCESTER	YES	NO	NO	MUNICIPAL	NO		2000	2000	2000	2000	0
345	HARDWICK	INACTIVE	RTE 32/FURNACE RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	MUNICIPAL	NO		0	0	0	0	0
347	HARVARD	INACTIVE	DEPOT RD	SLF	1984	4	4	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	NO	NO		7500	0	0	0	0
348	HARWICH	ACTIVE	QUEEN ANN RD	SLF	1997	47	47	MUNICIPAL	MUNICIPAL	S	BARNSTABLE	YES	NO	NO	NO	NO		8500	8500	8500	8500	8500
350	HATFIELD	ACTIVE	STRAITS RD/GT POND RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	NO	YES	NO	NO	YES		0	0	0	0	0

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352	HAVERHILL	INACTIVE	GROVELAND RD	SLF	1986	46	0	MUNICIPAL	MUNICIPAL	N	ESSEX	NO	NO	NO	MUNICIPAL	NO		0	0	0	0	0
357	HAVERHILL	ACTIVE	WARD HILL (OGDEN MARTIN)	SLF	2010	83	55	COMMERCIAL	COMMERCIAL	N	ESSEX	YES	NO	YES	NO	NO		0	200000	200000	200000	200000
355	HAVERHILL	ACTIVE	OLD GROVELAND RD (SLUDGE ONLY DISPOSAL)	SLF	1988	46	0	MUNICIPAL	MUNICIPAL	N	ESSEX	NO	NO	YES	INDUSTRIAL	NO	NO	0	0	0	0	0
358	HAVERHILL	ACTIVE	40 SOUTH PORTER ST	SLF/WWTP	-1	55	61	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	MUNICIPAL	NO		2700	2700	2700	2700	2700
360	HEATH	ACTIVE	BARRINGTON RD	SLF	1988	15	7	MUNICIPAL	COMMERCIAL	W	FRANKLIN	YES	NO	NO	NO	NO		1200	1200	1200	1200	0
361	HINGHAM	ACTIVE	HOBART ST	SLF	1993	31	31	MUNICIPAL	MUNICIPAL	N	PLYMOUTH	YES	NO	NO	NO	NO		14600	14600	14600	14600	14600
364	HINSDALE	ACTIVE	PLUNKETT HILL RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	YES	NO	NO	YES		0	0	0	0	0
366	HOLBROOK	ACTIVE	MAPLE ST	SLF	1988	15	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	NO	NO	NO		7500	7500	7500	7500	0
367	HOLBROOK	INACTIVE	SMITH LANE	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	NO	NO	NO		0	0	0	0	0
368	HOLBROOK	INACTIVE	WEYMOUTH ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	NO	NO	NO		0	0	0	0	0
369	HOLBROOK	ACTIVE	*	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	NO	NO	NO	NO	NO		0	0	0	0	0
370	HOLDEN	INACTIVE	RIVER ST	SLF	1987	25	15	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		8000	8000	8000	0	0
372	HOLLAND	ACTIVE	STURBRIDGE RD	SLF SD?	1988	8	8	MUNICIPAL	MUNICIPAL	W	HAMPDEN	YES	YES	NO	NO	YES		2500	2500	2600	2600	0
376	HOLLISTON	INACTIVE	MARSHALL ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
379	HOLYOKE	INACTIVE	HOMESTEAD AVE	ALF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	NO	NO	YES	NO	NO		0	0	0	0	0
382	HOLYOKE	INACTIVE	WHITNEY AVE	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	YES	NO	NO	NO	NO		0	0	0	0	0
383	HOPEDALE	INACTIVE	S MAIN ST/RTE 140 (MJ MURPHY-BFI)	SLF	1987	12	12	COMMERCIAL	COMMERCIAL	C	WORCESTER	YES	NO	NO	NO	NO		10500	10500	10500	0	0
384	HOPEDALE	ACTIVE	MENDON ST	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	MUNICIPAL	NO		0	0	0	0	0
385	HOPEDALE	INACTIVE	DRAPER DUMP	SLF	1970	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		0	0	0	0	0
386	HOPKINTON	CLOSED	RTE 135 (RITTER DUMP -EJ HARVEY)	SLF	1985	44	44	COMMERCIAL	COMMERCIAL	C	MIDDLESEX	YES	NO	NO	NO	NO		8000	0	0	0	0
389	HUBBARDSTON	ACTIVE	NEW TEMPETON RD	SLF	1988	5	5	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		1000	1000	1000	1000	0
393	HUDSON	INACTIVE	COX ST/OLD STOW RD (MELONE)	SLF	1980	0	0	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
392	HUDSON	ACTIVE	CEMETARY RD/HUDSON RD (MELONE)	SLF	1988	23	3	COMMERCIAL	COMMERCIAL	C	MIDDLESEX	YES	NO	NO	NO	NO		3000	3000	3000	3000	19000
398	HUNTINGTON	INACTIVE	BASKET RD	SLF	0	0	0	MUNICIPAL	COMMERCIAL	W	HAMPDEN	NO	NO	NO	NO	NO		0	0	0	0	0
402	IPSWICH	CLOSED	TOWN FARM RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	NO	NO	NO	MUNICIPAL	NO		0	0	0	0	0
403	KINGSTON	ACTIVE	SMITH LN/CRANBERRY RD	SLF	1999	20	20	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	YES	NO	NO	NO		4500	4500	4500	4500	0
404	LAKEVILLE	ACTIVE	RTE 97/RHODE IS RD	SLF	1996	18	18	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	YES	NO	NO	YES		5400	5400	5400	5400	5400
406	LAKEVILLE	INACTIVE	*	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	NO	NO	NO	YES		0	0	0	0	0
408	LANCASTER	ACTIVE	LUNENBURG RD	SLF	1988	8	8	MUNICIPAL	MUNICIPAL	C	PLYMOUTH	YES	NO	NO	NO	NO		4000	4000	4000	4000	0
409	LANCASTER	INACTIVE	MILL ST	SLF	1964	0	0	MUNICIPAL	MUNICIPAL	C	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
410	LANCASTER	INACTIVE	SHIRLEY/FT POND RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	C	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
411	LANCASTER	INACTIVE	OLD SHIRLEY RD (FT DEV?)	SLF SD?	0	0	0	MUNICIPAL	MUNICIPAL	C	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
412	LANESBOROUGH	CLOSED	OLD ORE BED RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	NO	YES	NO	NO		0	0	0	0	0
418	LAWRENCE	INACTIVE	MARSTON ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		0	0	0	0	0
419	LEE	ACTIVE	WILLOW HILL ST	SLF	1988	50	15	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	YES	NO	NO	BOTH	NO		0	38000	38000	38000	0
424	LEE	ACTIVE	RTE 102 (MEAD PAPER)	SLF/WWTP	0	20	0	COMMERCIAL	COMMERCIAL	W	BERKSHIRE	NO	NO	NO	INDUSTRIAL	NO		20	20	20	20	20
425	LEE	ACTIVE	WILLOW HILL RD (KIM CLK)	SLF	1990	50	15	COMMERCIAL	COMMERCIAL	W	BERKSHIRE	NO	NO	NO	INDUSTRIAL	YES		7500	7500	7500	7500	4000
426	LEE	INACTIVE	WOODLAWN AVE	SLF	0	0	0	COMMERCIAL	COMMERCIAL	W	BERKSHIRE	NO	NO	NO	NO	NO		0	0	0	0	0
427	LEICESTER	ACTIVE	MANVILLE RD	SLF	1992	36	36	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		4700	4700	4700	4700	4700
428	LEICESTER	INACTIVE	CHAPEL ST	SLF	1987	36	36	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		6000	6000	6000	0	0
429	LEICESTER	ACTIVE	10 MARKET ST/PINE ST	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	YES	MUNICIPAL	NO		195	195	195	195	195
430	LENOX	INACTIVE	WILLOW CREEK RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	YES	NO	NO	NO	YES		0	0	0	0	0
431	LENOX	ACTIVE	CRYSTAL ST	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	NO	NO	MUNICIPAL	NO		15	15	15	15	15
435	LEOMINSTER	INACTIVE	MECHANIC ST	SLF	1986	17	17	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	MUNICIPAL	NO		5000	7000	0	0	0
437	LEOMINSTER	INACTIVE	JOHNY APPLESEED LN	SLF	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		0	0	0	0	0

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438	LEVERETT	ACTIVE	JANUARY RD/CEMETARY RD	SLF	1990	10	10	MUNICIPAL	MUNICIPAL	W	FRANKLIN	YES	NO	NO	NO	NO		1000	1000	1300	1300	1300
439	LEXINGTON	INACTIVE	HARTWELL AVE	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	NO	NO	NO	NO	NO		0	0	0	0	0
442	LINCOLN	ACTIVE	LANDFILL RD/N GREAT RD/OFF 2A	SLF	1988	36	4	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		5200	5600	5600	5600	0
443	LINCOLN	INACTIVE	MILL ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
444	LITTLETON	ACTIVE	SPECTACLE POND RD	SLF	1988	54	4	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	YES	NO	NO	NO	NO		4500	4500	4500	4500	0
446	LONGMEADOW	INACTIVE	TINA LN	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	YES	NO	NO	MUNICIPAL	YES		0	0	0	0	0
447	LONGMEADOW	INACTIVE	EMERSON POND	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	YES	NO	NO	NO	NO		0	0	0	0	0
448	LOWELL	ACTIVE	WESTFORD ST	SLF	1995	13	0	MUNICIPAL	COMMERCIAL	N	MIDDLESEX	YES	NO	NO	MUNICIPAL	NO		71500	81500	81500	81500	81500
450	LOWELL	INACTIVE	NEWMISTH ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
451	LOWELL	INACTIVE	CHELMSFORD ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
452	LOWELL	INACTIVE	METHUEN ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	YES	NO	NO		0	0	0	0	0
455	LUDLOW	ACTIVE	HOLYOKE ST (RCI)	SLF	1988	30	22	MUNICIPAL	COMMERCIAL	W	HAMPDEN	YES	NO	NO	NO	NO		8000	8000	6800	6800	0
456	LUNENBURG	ACTIVE	YOUNGS RD (NEW)	SLF	1993	30	8	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		6000	6000	6000	6000	6000
457	LUNENBURG	INACTIVE	TOWNSEND HARBOR RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	NO	NO		0	0	0	0	0
459	LYNN	ACTIVE	COMMERCIAL ST	SLF/WWTP	1988	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	MUNICIPAL	NO		4100	4100	4100	4100	0
461	LYNN	ACTIVE	RTE 107 (GE)	SLF	0	0	0	COMMERCIAL	COMMERCIAL	N	ESSEX	NO	YES	NO	NO	NO		0	0	0	0	0
463	LYNNFIELD	INACTIVE	CHESTNUT ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	YES		0	0	0	0	0
466	MANCHESTER	ACTIVE	PINE ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	NO	NO	NO	NO	YES		0	0	0	0	0
469	MANSFIELD	INACTIVE	EAST ST	SLF	1999	300	0	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	NO	NO	MUNICIPAL	NO		10000	10000	10000	10000	10000
471	MANSFIELD	ACTIVE	FRIUT ST	WWTP/DDS	0	0	0	MUNICIPAL	MUNICIPAL	S	BRISTOL	NO	NO	NO	MUNICIPAL	NO		300	300	300	300	300
474	MARION	ACTIVE	2 SPRING ST/BENSON BK	SLF/WWTP	2010	95	95	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	YES	NO	MUNICIPAL	YES		23000	23000	23000	23000	23000
475	MARION	ACTIVE	RTE 6/MILL ST	SLF	0	0	0	COMMERCIAL	COMMERCIAL	S	PLYMOUTH	NO	NO	YES	INDUSTRIAL	NO		0	0	0	0	0
476	MARLBOROUGH	CLOSED	BOLTON ST/RTE 85	SLF	1976	0	0	MUNICIPAL	COMMERCIAL	C	MIDDLESEX	NO	NO	NO	NO	NO		0	0	0	0	0
478	MARLBOROUGH	ACTIVE	785 BOSTON POST RD	WWTP/DDS	0	0	0	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	NO	NO	NO	MUNICIPAL	NO		1092	1092	1092	1092	1092
479	MARLBOROUGH	ACTIVE	BOUNDARY ST	WWTP/DDS	0	0	0	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	NO	NO	NO	MUNICIPAL	NO		363	363	363	363	363
480	MARSHFIELD	INACTIVE	SNOW RD	SLF	0	0	0	COMMERCIAL	COMMERCIAL	S	PLYMOUTH	NO	YES	NO	NO	NO		0	0	0	0	0
481	MARSHFIELD	ACTIVE	CLAY PIT RD (SA RAY)	DLF	0	27	0	COMMERCIAL	COMMERCIAL	S	PLYMOUTH	NO	YES	NO	NO	NO		65000	65000	65000	65000	130000
483	MARSHFIELD	ACTIVE	CLAY PIT RD	SLF	1995	52	26	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	YES	NO	MUNICIPAL	NO		12500	10200	10200	10200	10200
485	MARSHFIELD	INACTIVE	PINE ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
486	MARSHFIELD	INACTIVE	BRANT ROCK	SLF	1973	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
488	MASHPEE	ACTIVE	ASHERS PATH	SLF	1988	61	61	MUNICIPAL	COMMERCIAL	S	BARNSTABLE	YES	NO	YES	NO	NO		5500	5500	5500	5500	0
489	MATTAPOISETT	INACTIVE	RAILROAD AVE/NORTH ST	SLF	1972	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
490	MATTAPOISETT	INACTIVE	TINKHAM HILL	SLF	1960	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
491	MATTAPOISETT	ACTIVE	NORTH ST/TINKHAM HILL	SLF	1999	25	25	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	YES	NO	NO	YES		2200	2200	2200	2200	2200
492	MAYNARD	CLOSED	WALTHAM ST	SLF	1983	14	14	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	NO	NO	NO	NO	NO		0	0	0	0	0
494	MEDFIELD	ACTIVE	GROVE ST	SLF	1988	6	6	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	NO	NO	NO		7200	7200	7200	7200	0
496	MEDFIELD	ACTIVE	99 BRIDGE ST	WWTP/DDS	0	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	NO	NO	NO	MUNICIPAL	NO		104	104	104	104	104
498	MEDFORD	INACTIVE	RIVERSIDE AVE	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
499	MEDWAY	INACTIVE	OAKLAND ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	C	NORFOLK	NO	NO	NO	NO	NO		0	0	0	0	0
500	MEDWAY	INACTIVE	HIGHLAND ST	SLF	1920	0	0	MUNICIPAL	MUNICIPAL	C	NORFOLK	NO	NO	NO	NO	NO		0	0	0	0	0
501	MEDWAY	INACTIVE	BROAD ST EXTENSION	SLF	1992	0	0	MUNICIPAL	MUNICIPAL	C	NORFOLK	NO	NO	NO	NO	NO		0	0	0	0	0
502	MEDWAY	ACTIVE	66 VILLAGE ST (CHARLES RIVER PCD)	WWTP/DDS	0	0	0	MUNICIPAL	MUNICIPAL	C	NORFOLK	NO	NO	NO	MUNICIPAL	NO		750	750	750	750	750
503	MERRIMAC	ACTIVE	MILL ST	WWTP/DDS	0	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	NO	NO	NO	MUNICIPAL	NO		2	2	2	2	2
505	MENDON	INACTIVE	BELLINGHAM RD	SLF	1975	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	NO	NO		0	0	0	0	0
506	MERRIMAC	ACTIVE	BATTIS RD	SLF	1994	35	5	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		3100	3100	3100	3100	3100
510	METHUEN	ACTIVE	LANCASTER ST/HUNTINGTON ST	SLF	1988	20	5	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		30000	0	0	0	0

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514	MIDDLEBOROUGH	CLOSED	PLYMOUTH ST	SLF	0	0	25	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	YES	NO	NO	NO		0	0	0	0	0
515	MIDDLEBOROUGH	ACTIVE	BROOK ST	SLF	1988	25	23	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	NO	NO	MUNICIPAL	NO		10600	10600	10600	10600	0
516	MIDDLEBOROUGH	ACTIVE	3 SUMMER ST	DLF	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	YES	NO	NO	NO		0	0	0	0	0
518	MIDDLEBOROUGH	INACTIVE	PLYMPTON ST	SLF	1968	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	NO	NO	NO	NO		0	0	0	0	0
520	MIDDLEFIELD	INACTIVE	CHESTER RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPSHIRE	NO	YES	NO	NO	YES		0	0	0	0	0
521	MIDDLEFIELD	INACTIVE	SKYLINE TRAIL	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPSHIRE	YES	NO	NO	NO	NO		0	0	0	0	0
522	MIDDLEFIELD	INACTIVE	MIDDLEFIELD RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPSHIRE	YES	NO	NO	NO	NO		0	0	0	0	0
524	MIDDLETON	ACTIVE	RIVER ST/DOVER ST	SLF	1994	35	2	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		4200	4200	4200	4200	4200
525	MIDDLETON	INACTIVE	EAST ST (RUBCHINK)	SLF	1927	0	0	COMMERCIAL	COMMERCIAL	N	ESSEX	NO	NO	NO	NO	NO		0	0	0	0	0
526	MILFORD	INACTIVE	CEDAR ST	SLF	1975	19	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	NO	NO		0	0	0	0	0
527	MILFORD	ACTIVE	SOUTH MAIN ST/RTE 140 HOPEDALE	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	MUNICIPAL	NO		600	600	600	600	600
528	MILLBURY	INACTIVE	RIVERLIN RD	SLF	1967	18	2	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	MUNICIPAL	NO		12000	12000	12000	0	0
531	MILLBURY	ACTIVE	RTE 20 (UPPER BLACKSTONE)	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	MUNICIPAL	NO		3300	3300	3300	3300	3300
532	MILLIS	ACTIVE	ISLAND ST	SLF	1988	12	12	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	NO	NO	NO		9600	9600	9600	9600	0
533	MILLIS	ACTIVE	7 WATER ST	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	NO	NO	NO	MUNICIPAL	NO		0	0	0	0	0
534	MILLVILLE	INACTIVE	RTE 122	SLF	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	NO	NO		0	0	0	0	0
535	MILTON	ACTIVE	RANDOLPH AVE/RTE 28 (ACE)	SLF	1988	135	30	MUNICIPAL	COMMERCIAL	N	NORFOLK	YES	NO	NO	NO	NO		25500	25500	25500	25500	0
536	MONROE	ACTIVE	READSBORO RD (DEERFIELD)	SLF	0	0	0	COMMERCIAL	COMMERCIAL	W	FRANKLIN	NO	NO	NO	INDUSTRIAL	NO		0	0	0	0	0
539	MONSON	INACTIVE	PALMER RD/HOSPITAL RD	SLF	0	0	0	COMMERCIAL	MUNICIPAL	W	HAMPDEN	YES	NO	NO	NO	NO		0	0	0	0	0
540	MONTAGUE	ACTIVE	TURNPIKE RD	SLF	1988	20	20	MUNICIPAL	MUNICIPAL	W	FRANKLIN	YES	YES	NO	BOTH	NO		7000	10700	6800	6800	0
543	MONTEREY	ACTIVE	GOULD RD	SLF	1988	6	6	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	YES	YES	NO	NO	NO		1000	1000	1000	1000	0
544	NANTUCKET	ACTIVE	MADAKET RD	SLF	1993	47	47	MUNICIPAL	MUNICIPAL	S	NANTUCKET	YES	YES	NO	NO	YES		12000	12000	12000	12000	15000
545	NANTUCKET	ACTIVE	MAIN ST	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	S	NANTUCKET	NO	NO	NO	MUNICIPAL	NO		0	0	0	0	0
546	NATICK	ACTIVE	WEST ST	SLF	1992	81	37	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		22000	22000	22000	22000	22000
547	NEEDHAM	ACTIVE	CENTRAL AVE/RTE 135	SLF	1990	62	62	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	NO	NO	NO		20000	25000	25000	25000	25000
548	NEW ASHFORD	INACTIVE	INGRAHAM RD	SLF	0	0	0	COMMERCIAL	MUNICIPAL	W	BERKSHIRE	NO	NO	YES	NO	NO		0	0	0	0	0
549	NEW BEDFORD	ACTIVE	1103 SHAWMAUT AVE	SLF	1990	60	42	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	NO	NO	MUNICIPAL	NO		150000	150000	150000	150000	75000
551	NEW BEDFORD	ACTIVE	CHURCH ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	BRISTOL	NO	YES	NO	NO	YES		0	0	0	0	0
556	NEW MARLBOROUGH	ACTIVE	SO SANDISFIELD RD/RTE 57	DLF	0	0	0	COMMERCIAL	COMMERCIAL	W	BERKSHIRE	NO	YES	NO	NO	YES		0	0	0	0	0
559	NEWBURY	ACTIVE	BOSTON/MAY ST	SLF	1989	27	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		3200	0	0	0	0
560	NEWBURYPORT	INACTIVE	CROW LANE	SLF	1986	15	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	MUNICIPAL	NO		14500	15000	0	0	0
562	NEWBURYPORT	INACTIVE	(CORWAN LANDFILL)	SLF	0	0	0	COMMERCIAL	COMMERCIAL	N	ESSEX	YES	NO	NO	NO	NO		0	0	0	0	0
564	NEWTON	ACTIVE	ELLIOT ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	NO	NO	NO	NO	NO		0	0	0	0	0
566	NEWTON	ACTIVE	LEXINGTON/RIVER ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	NO	NO	NO	NO	NO		0	0	0	0	0
568	NEWTON	INACTIVE	RUMFORD AVE	SLF	1975	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
569	NORFOLK	ACTIVE	MEDWAY RD	SLF	1995	50	16	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	NO	NO	NO		4000	4000	4000	4000	4000
573	NORTH ADAMS	ACTIVE	AVENUE E/D STREET	SLF	1988	25	25	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	YES	NO	NO	NO	NO		19000	19000	19000	19000	0
575	NORTH ANDOVER	INACTIVE	HOLT RD	SLF	1986	12	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		14500	20300	0	0	0
578	NORTH ANDOVER	INACTIVE	SHARPNERS POND	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	NO	NO	NO	NO	NO		0	0	0	0	0
579	NORTH ATTLEBOROUGH	ACTIVE	MOUNT HOPE RD	SLF	1997	47	47	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	YES	NO	MUNICIPAL	NO		12000	20400	20400	20400	20400
581	NORTH BROOKFIELD	ACTIVE	EAST BROOKFIELD RD	SLF/WWTP	1990	0	0	MUNICIPAL	COMMERCIAL	C	WORCESTER	YES	NO	NO	MUNICIPAL	NO		2500	2500	2500	2500	2500
583	NORTH BROOKFIELD	INACTIVE	BRADSHAW ST	SLF	1940	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	NO	NO		0	0	0	0	0
584	NORTH BROOKFIELD	INACTIVE	NEW BRAINTREE RD	SLF	1930	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		0	0	0	0	0
585	NORTH READING	INACTIVE	PARK ST	SLF	1968	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	NO	NO	NO	NO	NO		0	0	0	0	0
586	NORTHAMPTON	ACTIVE	GLENDALE RD (PARTYKA)	SLF	1988	52	20	MUNICIPAL	COMMERCIAL	W	HAMPSHIRE	YES	YES	NO	MUNICIPAL	NO		25000	28000	26000	26000	25000
592	NORTHBOROUGH	INACTIVE	BOUNDARY ST/CHURCH ST	SLF	1960	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		0	0	0	0	0

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593	NORTHBRIDGE	INACTIVE	QUAKER RD	SLF	1988	10	10	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		7500	7500	7500	7500	0
594	NORTHBRIDGE	ACTIVE	PROVIDENCE RD	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	MUNICIPAL	NO		192	192	192	192	192
598	NORTHFIELD	ACTIVE	NEWTON FARM/RTE 63 (ERVING PAPER CO)	SLF	0	0	0	COMMERCIAL	COMMERCIAL	W	FRANKLIN	NO	NO	NO	INDUSTRIAL	NO		0	0	0	0	0
599	NORTHFIELD	ACTIVE	MEADOW ST	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	W	FRANKLIN	NO	NO	NO	MUNICIPAL	NO		0	0	0	0	0
601	NORTON	INACTIVE	HILL ST	SLF	1987	13	13	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	YES	NO	MUNICIPAL	NO		9500	9500	9500	0	0
605	NORTON	INACTIVE	UNION ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	BRISTOL	NO	NO	NO	NO	NO		0	0	0	0	0
607	NORWELL	INACTIVE	PINE ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
610	NORWOOD	ACTIVE	CEMETERY ST/OFF WINTER ST	SLF	1982	16	16	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	NO	NO	NO		21200	21200	21200	21200	0
613	OAK BLUFFS	ACTIVE	COUNTY RD	SLF	1996	0	0	MUNICIPAL	MUNICIPAL	S	DUKES	YES	NO	NO	NO	NO		2500	2500	2500	2500	2500
615	OAKHAM	ACTIVE	SOUTH RD	SLF	1988	4	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		600	600	600	600	600
618	ORANGE	ACTIVE	JONES RD	SLF	1988	12	12	MUNICIPAL	MUNICIPAL	W	FRANKLIN	YES	NO	NO	MUNICIPAL	NO		5000	5000	5200	5200	0
620	ORLEANS	ACTIVE	LOTS HOLLOW RD	SLF	1990	20	20	MUNICIPAL	MUNICIPAL	S	BARNSTABLE	YES	NO	NO	NO	NO		5200	5200	5200	5200	5200
621	OTIS	INACTIVE	HAWLEY RD	SLF	0	0	0	COMMERCIAL	COMMERCIAL	W	BERKSHIRE	NO	NO	NO	NO	NO		0	0	0	0	0
622	OTIS	ACTIVE	WEST CENTER RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	YES	NO	NO	YES		0	0	0	0	0
624	OXFORD	INACTIVE	FEDERAL HILL RD	SLF	1987	5	5	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		7000	7000	7000	0	0
628	OXFORD	ACTIVE	COMMINSVILLE RD	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	MUNICIPAL	NO		5	5	5	5	5
629	PALMER	ACTIVE	AIRPORT RD/EMERY ST	SLF	1988	23	23	MUNICIPAL	COMMERCIAL	W	HAMPDEN	YES	NO	NO	MUNICIPAL	NO		10000	10800	8600	8600	10800
630	PALMER	INACTIVE	STATE ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	NO	NO	NO	NO	NO		0	0	0	0	0
631	PALMER	INACTIVE	RTE 32	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	YES	NO	NO	NO	NO		0	0	0	0	0
632	PALMER	INACTIVE	BONDSVILLE RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	YES	NO	NO	NO	NO		0	0	0	0	0
633	PALMER	ACTIVE	NORRELL ST/THREE RIVERS	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	NO	NO	NO	MUNICIPAL	NO		800	800	800	800	800
635	PAXTON	INACTIVE	DAVIS HILL RD	SLF	1970	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		0	0	0	0	0
637	PEABODY	ACTIVE	DEARBORN RD (SCR)	SLF	1988	24	18	COMMERCIAL	COMMERCIAL	N	ESSEX	YES	YES	NO	NO	NO		58500	59500	59500	59500	0
638	PEABODY	ACTIVE	TOWN FARM RD (NESWC)	ALF	1990	60	12	STATE	MUNICIPAL	N	ESSEX	NO	NO	YES	MUNICIPAL	NO		40000	40000	40000	40000	109500
639	PEMBROKE	INACTIVE	*	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	NO	NO	NO	NO		0	0	0	0	0
640	PEMBROKE	ACTIVE	HOBCMOCK ST	SLF	1992	30	30	MUNICIPAL	COMMERCIAL	S	PLYMOUTH	YES	YES	NO	NO	NO		5500	5500	5500	5500	5500
641	PEMBROKE	INACTIVE	SCHOOL ST/RTE 27	SLF	0	0	0	COMMERCIAL	MUNICIPAL	S	PLYMOUTH	NO	YES	NO	NO	YES		0	0	0	0	0
642	PEPPERELL	ACTIVE	BOYNTON ST	SLF	1993	14	12	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	YES	NO	NO	NO	NO		5000	5000	5000	5000	5000
645	PEPPERELL	ACTIVE	NASHUA RD/P.O. BOX 31	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	NO	NO	NO	MUNICIPAL	NO		30	30	30	30	30
646	PETERSHAM	INACTIVE	N SALEM RD/RTE 122	SLF	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	NO	NO		0	0	0	0	0
647	PETERSHAM	INACTIVE	SHAW RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	YES		0	0	0	0	0
648	PHILLIPSTON	INACTIVE	TEMPLETON/MILLER RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	YES	NO	NO		0	0	0	0	0
649	PITTSFIELD	ACTIVE	HUBBARD AVE	ALF	0	5	5	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	NO	YES	NO	NO		0	0	0	0	0
650	PITTSFIELD	ACTIVE	EAST/HUBBARD ST (VICON)	SLF	1999	5	5	MUNICIPAL	COMMERCIAL	W	BERKSHIRE	NO	NO	NO	NO	NO		80500	80500	80500	80500	17500
651	PITTSFIELD	INACTIVE	DOWNING PARKWAY	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	NO	NO	NO	NO		0	0	0	0	0
653	PITTSFIELD	ACTIVE	901 HOLMES RD	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	NO	NO	MUNICIPAL	NO		708	708	708	708	708
654	PLAINFIELD	INACTIVE	RIVER/WEST HILL RD	SLF	0	0	0	COMMERCIAL	MUNICIPAL	W	HAMPSHIRE	YES	NO	NO	NO	NO		0	0	0	0	0
657	PLAINVILLE	INACTIVE	COWELL ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	NORFOLK	YES	NO	NO	NO	NO		0	0	0	0	0
658	PLAINVILLE	ACTIVE	BELCHER/RTE 1-495 (LAIDLAW)	SLF	1999	139	133	COMMERCIAL	COMMERCIAL	S	NORFOLK	YES	NO	NO	NO	NO		234000	234000	547500	547500	547500
659	PLYMOUTH	ACTIVE	BEAVER DAM RD	SLF	1988	16	14	MUNICIPAL	COMMERCIAL	S	PLYMOUTH	YES	NO	NO	MUNICIPAL	NO		65000	65000	65000	65000	0
660	PLYMOUTH	INACTIVE	CEDARVILLE RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
661	PLYMOUTH	ACTIVE	MANOMET (BFI)	SLF	-1	0	0	MUNICIPAL	COMMERCIAL	S	PLYMOUTH	YES	NO	NO	NO	NO		0	0	0	0	0
663	PLYMOUTH	INACTIVE	HEDGES POND RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
666	PRINCETON	ACTIVE	HUBBARDSTON RD	SLF	1988	7	7	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		1500	1500	1500	1500	0
667	PRINCETON	INACTIVE	RTE 140/RTE 62	SLF	1970	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	NO	NO		0	0	0	0	0

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ID#	TOWN	STATUS	ADDRESS	KIND	CLOSE	BOH ACRES	DEQE ACRES	OWNER	OPER	REG	COUNTY	REFUSE	DEMO	ASH	SLUDGE	STUMPS	OIL CONT SOIL	LTPY 95	LTPY 96	LTPY 97	LTPY 98	LTPY 99
669	PROVINCETOWN	ACTIVE	RACE POINT RD	SLF	1990	25	25	MUNICIPAL	MUNICIPAL	S	BARNSTABLE	YES	NO	NO	NO	NO		4200	4200	4200	4200	4200
671	QUINCY	INACTIVE	WILLARD ST/RIDOLFUTTI DR. (BFI)	SLF	1987	80	80	MUNICIPAL	COMMERCIAL	N	NORFOLK	YES	NO	NO	NO	NO		84500	84500	84500	0	0
670	QUINCY	ACTIVE	147 SEA AVE (NUT ISLAND)	WTP/DCS	0	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	NO	NO	NO	MUNICIPAL	NO		7049	7049	7049	7049	7049
673	RANDOLPH	ACTIVE	JOHNSON ST (BFI)	SLF	1999	64	64	COMMERCIAL	COMMERCIAL	N	NORFOLK	YES	NO	NO	NO	NO		32500	32500	32500	32500	0
674	RAYNHAM	ACTIVE	KING PHILLIP RD	SLF	1997	36	16	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	NO	NO	NO	NO		5500	5500	5500	5500	5500
682	REHOBOTH	ACTIVE	MARTIN ST/RTE 118	SLF	1989	30	30	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	NO	NO	NO	NO		5500	5500	5500	5500	0
685	RICHMOND	INACTIVE	HILL RD	SLF	1970	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	NO	NO	NO	NO		0	0	0	0	0
686	ROCHESTER	ACTIVE	HIGH ST	SLF	1999	25	25	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	NO	NO	NO	NO		4000	4000	4000	4000	0
687	ROCHESTER	INACTIVE	HIGH ST	SLF	1963	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
688	ROCKLAND	ACTIVE	BEECH ST	SLF	1993	92	92	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	NO	NO	MUNICIPAL	NO		20000	20200	20200	20200	20200
689	ROCKLAND	INACTIVE	(WALEN BRS INC)	SLF	1976	44	0	COMMERCIAL	COMMERCIAL	S	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
693	ROCKPORT	ACTIVE	RTE 127/MAIN ST	SLF	1988	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		5000	5000	5000	5000	0
694	ROCKPORT	INACTIVE	MAIN ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	NO	NO	NO	NO	NO		0	0	0	0	0
697	ROWE	ACTIVE	ZOAR RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	FRANKLIN	NO	YES	NO	NO	YES		0	0	0	0	0
701	ROWLEY	ACTIVE	OLD ROWLEY RD	SLF	1988	18	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		2900	2900	2900	2900	0
702	ROYALSTON	ACTIVE	TOWN DUMP RD	SLF	-1	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		0	600	600	600	600
704	RUSSELL	INACTIVE	WORONOCO ST	SLF	0	0	0	COMMERCIAL	COMMERCIAL	W	HAMPDEN	NO	NO	NO	INDUSTRIAL	NO		0	0	0	0	0
705	RUSSELL	ACTIVE	*	SLF	0	0	0	COMMERCIAL	COMMERCIAL	W	HAMPDEN	NO	NO	NO	INDUSTRIAL	NO		0	0	0	0	0
707	RUTLAND	INACTIVE	POMMOGUSSETT RD	SLF	1971	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	NO	NO		0	0	0	0	0
708	RUTLAND	INACTIVE	CHARNOCK RD	SLF	1987	10	10	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		2500	2500	2500	0	0
710	SALEM	ACTIVE	SWAMPSCOTT RD	SLF	-1	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	YES	NO	NO	NO		0	0	0	0	0
713	SALISBURY	ACTIVE	OLD COUNTY RD	SLF	1989	10	10	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		4300	4300	4300	4300	0
715	SANDISFIELD	ACTIVE	WEST ST	DLF	0	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	YES	NO	NO	YES		0	0	0	0	0
716	SANDISFIELD	INACTIVE	57 MONTVILLE HILL	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	YES	NO	NO	NO	NO		0	0	0	0	0
718	SANDWICH	ACTIVE	WATER ST/RTE 130	SLF	1998	10	10	MUNICIPAL	MUNICIPAL	S	BARNSTABLE	YES	YES	NO	NO	NO		11000	11000	11000	11000	0
721	SAUGUS	INACTIVE	1110 WESTERN AVE	ALF	0	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	NO	NO	YES	NO	NO		0	0	0	0	0
722	SAUGUS	ACTIVE	MAIN ST	SLF	1999	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	NO	NO	NO	NO	NO		0	0	0	0	0
723	SAUGUS	ACTIVE	100 SALEM TPK (RESCO)	ALF	-1	196	196	COMMERCIAL	COMMERCIAL	N	ESSEX	NO	NO	YES	NO	NO		502500	502500	502500	502500	146000
724	SAUGUS	INACTIVE	(DEMATTEO)	SLF	0	0	0	COMMERCIAL	COMMERCIAL	N	ESSEX	NO	NO	NO	NO	NO		0	0	0	0	0
725	SAVOY	ACTIVE	CHAPEL RD	SLF	1988	10	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	YES	NO	NO	NO	NO		400	400	400	400	0
726	SCITUATE	ACTIVE	161 DRIFTWAY RD	SLF/WWTP	1996	57	57	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	NO	NO	MUNICIPAL	NO		20000	20000	20000	20000	20000
730	SEEKONK	ACTIVE	FALL RIVER RD	SLF	1988	14	14	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	NO	NO	NO	NO		7500	7500	0	0	0
731	SEEKONK	INACTIVE	NEWMAN ST/RTE 152	SLF	0	0	4	MUNICIPAL	MUNICIPAL	S	BRISTOL	NO	NO	NO	NO	NO		0	0	0	0	0
733	SHARON	ACTIVE	MOUNTAIN ST	SLF	1988	35	35	MUNICIPAL	MUNICIPAL	S	NORFOLK	YES	NO	NO	NO	NO		15000	15000	15000	15000	0
736	SHEFFIELD	INACTIVE	UPPER BARNUM ST	SLF	1977	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	YES	NO	NO	NO	NO		0	0	0	0	0
737	SHEFFIELD	INACTIVE	SALISBURY RD	SLF	0	0	0	COMMERCIAL	MUNICIPAL	W	BERKSHIRE	NO	NO	NO	NO	NO		0	0	0	0	0
738	SHERBORN	ACTIVE	MAIN ST/RTE 27	SLF	1988	15	5	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		2900	2900	2900	2900	0
739	SHERBORN	INACTIVE	RTE 27/NATICH 62	SLF	0	5	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
741	SHIRLEY	ACTIVE	LEOMINSTER RD (GRAVEL PIT)	SLF	1988	40	40	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	YES	NO	NO	NO	NO		4500	4500	4500	4500	0
743	SHREWSBURY	ACTIVE	RTE 20 (WHEELABRATOR)	ALF	2006	147	20	COMMERCIAL	COMMERCIAL	C	WORCESTER	YES	NO	YES	NO	NO		14000	14000	375000	375000	375000
744	SHREWSBURY	ACTIVE	RTE 20	SLF	1988	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	MUNICIPAL	NO		0	0	0	0	0
745	SHREWSBURY	ACTIVE	RTE 20 (SIGNAL-DUPLICATE SITE,DELETE)	ALF	0	147	20	COMMERCIAL	COMMERCIAL	C	WORCESTER	NO	NO	YES	NO	NO		0	0	0	0	0
748	SOMERSET	ACTIVE	BRAYTON PT RD/RTE 6 (NE POWER)	ALF	1994	24	24	COMMERCIAL	COMMERCIAL	S	BRISTOL	NO	NO	YES	INDUSTRIAL	NO		16000	16000	16000	16000	16000
749	SOMERSET	INACTIVE	BRAYTON POINT RD	SLF	1986	40	40	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	NO	NO	NO	NO		0	0	0	0	0
751	SOUTH HADLEY	ACTIVE	INDUSTRIAL DRIVE	SLF	1991	40	20	MUNICIPAL	MUNICIPAL	W	HAMPSHIRE	YES	NO	NO	MUNICIPAL	NO		18000	18000	15600	15600	18000

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ID#	TOWN	STATUS	ADDRESS	KIND	CLOSE	BOT ACRES	DEQE ACRES	OWNER	OPER	REG	COUNTY	REFUSE	DEMO	ASH	SLUDGE	STUMPS	OIL CONT SOIL	LTPY 85	LTPY 86	LTPY 87	LTPY 88	LTPY 89
754	SOUTHAMPTON	ACTIVE	MOOSE BROOK RD	SLF	1989	41	25	MUNICIPAL	MUNICIPAL	W	HAMPSHIRE	YES	YES	NO	NO	YES		2500	2500	2600	2600	0
755	SOUTHAMPTON	INACTIVE	RTE 10	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPSHIRE	NO	NO	NO	NO	NO		0	0	0	0	0
756	SOUTHAMPTON	INACTIVE	FRY RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPSHIRE	NO	NO	NO	NO	NO		0	0	0	0	0
759	SOUTHBOROUGH	INACTIVE	PARKERVILLE RD	SLF	1976	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	NO	NO		0	0	0	0	0
760	SOUTHBOROUGH	INACTIVE	RTE 85	SLF	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		0	0	0	0	0
761	SOUTHBOROUGH	INACTIVE	SCHOOL ST	SLF	1953	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		0	0	0	0	0
762	SOUTHBRIDGE	INACTIVE	TORRY RD	SLF	1972	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	NO	NO		0	0	0	0	0
763	SOUTHBRIDGE	INACTIVE	GUELPH HILL RD	SLF	1957	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	NO	NO		0	0	0	0	0
764	SOUTHBRIDGE	ACTIVE	BAREFOOT FARM RD (NEW)	SLF	1993	27	23	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	MUNICIPAL	NO		10000	10000	10000	10000	10000
765	SOUTHBRIDGE	ACTIVE	DRESSER HILL RD	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	MUNICIPAL	NO		280	280	280	280	280
766	SOUTHWICK	ACTIVE	RTE 202/RTE 20	SLF	0	1	0	*	*	W	HAMPDEN	NO	YES	NO	NO	YES		0	0	0	0	0
768	SOUTHWICK	INACTIVE	SAM WEST RD	SLF	1976	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	NO	NO	NO	NO	NO		0	0	0	0	0
769	SPENCER	INACTIVE	SOUTH SPENCER RD	SLF	1987	6	6	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	MUNICIPAL	NO		6500	6500	6500	0	0
773	SPRINGFIELD	INACTIVE	COTTAGE ST	SLF	1970	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	NO	NO	NO	NO	NO		0	0	0	0	0
781	STERLING	ACTIVE	RTE 12 JUNCTION/STERLING CT/CHOCKSETT	SLF	1989	5	5	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		3500	3500	3500	3500	0
782	STOCKBRIDGE	INACTIVE	CHERRY HILL RD (A CAHALL)	SLF	0	13	0	COMMERCIAL	COMMERCIAL	W	BERKSHIRE	YES	NO	NO	NO	NO		0	0	0	0	0
783	STOCKBRIDGE	ACTIVE	GLENDALE MIDDLE RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	YES	NO	NO	YES		0	0	0	0	0
784	STOCKBRIDGE	ACTIVE	RT 102	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	NO	NO	MUNICIPAL	NO		40	40	40	40	40
785	STONEHAM	INACTIVE	HALL RD/BROOKBRIDGE RD	SLF	1970	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	NO	NO	NO	NO	YES		0	0	0	0	0
786	STONEHAM	INACTIVE	DALE ST/GAREY ST	SLF	1946	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
787	STOUGHTON	INACTIVE	PAGE ST	SLF	1976	0	0	MUNICIPAL	MUNICIPAL	S	NORFOLK	NO	NO	NO	NO	NO		0	0	0	0	0
790	STOW	INACTIVE	HARVARD RD	SLF	1987	0	0	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
791	STURBRIDGE	ACTIVE	BREAKNECK RD	SLF	1988	9	9	MUNICIPAL	COMMERCIAL	C	WORCESTER	YES	NO	NO	NO	NO		3500	3500	3500	3500	0
795	STURBRIDGE	INACTIVE	CEDAR ST	SLF	1973	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		0	0	0	0	0
798	SUDBURY	ACTIVE	490 BOSTON POST RD/RTE 20	SLF	1999	28	28	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	MUNICIPAL	NO		10000	14000	14000	14000	14000
796	SUDBURY	INACTIVE	RT 117	SLF	1970	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
801	SUNDERLAND	ACTIVE	RESERVOIR RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	FRANKLIN	NO	YES	NO	NO	YES		0	0	0	0	0
802	SUNDERLAND	ACTIVE	RTE 47/FALL/WESTON RD (WILLIAMS)	SLF/WWTP	0	0	0	COMMERCIAL	COMMERCIAL	W	FRANKLIN	NO	NO	NO	MUNICIPAL	NO		0	0	0	0	0
804	SUTTON	ACTIVE	OLD STONE RD	SLF	1989	39	39	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		3500	3500	3500	3500	0
805	SUTTON	INACTIVE	PUTNAM HILL	SLF	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		0	0	0	0	0
806	SWAMPSCOTT	INACTIVE	CLARK SCHOOL	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		0	0	0	0	0
807	SWAMPSCOTT	INACTIVE	PHILLIPS PARK	SLF	1938	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		0	0	0	0	0
808	SWAMPSCOTT	ACTIVE	531 HUMPHREY ST	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	NO	NO	NO	MUNICIPAL	NO		364	364	364	364	364
809	SWANSEA	INACTIVE	RTE 6/GAR HWY (BORGE)	SLF	0	0	0	COMMERCIAL	COMMERCIAL	S	BRISTOL	NO	NO	NO	NO	NO		0	0	0	0	0
811	TAUNTON	INACTIVE	WINTHOP ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	BRISTOL	NO	NO	NO	NO	NO		0	0	0	0	0
812	TAUNTON	ACTIVE	E BRITANNIA ST	SLF	1990	58	58	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	YES	NO	MUNICIPAL	YES		26500	27000	27000	27000	27000
813	TAUNTON	ACTIVE	825 W WATER ST	WWTP/DOS	0	20	0	MUNICIPAL	MUNICIPAL	S	BRISTOL	NO	NO	NO	MUNICIPAL	NO		1600	1600	1600	1600	1600
814	TEMPLETON	INACTIVE	RTE 2/2A	SLF	1980	51	45	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	MUNICIPAL	NO		0	0	0	0	0
816	TEMPLETON	ACTIVE	RTE 202	SLF	1988	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		5000	5000	5000	5000	0
818	TEMPLETON	ACTIVE	RESERVOIR ST	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	MUNICIPAL	NO		13500	13500	13500	13500	13500
820	TEWKSBURY	CLOSED	SOUTH ST (ROCCO LF)	SLF	1957	0	0	COMMERCIAL	COMMERCIAL	N	MIDDLESEX	NO	NO	NO	NO	NO		0	0	0	0	0
821	TEWKSBURY	INACTIVE	MARTHA AVE	SLF	1957	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	NO	NO	NO	NO	NO		0	0	0	0	0
824	TISBURY	ACTIVE	VINEYARD HAVEN RD/STATE HWY	SLF	1989	0	0	MUNICIPAL	MUNICIPAL	S	DUKES	YES	NO	NO	NO	NO		2000	2000	2000	2000	0
827	TOPSFIELD	INACTIVE	BRADY RD (LAFOE CONST)	SLF	0	0	0	COMMERCIAL	COMMERCIAL	N	ESSEX	NO	NO	NO	NO	YES		0	0	0	0	0
828	TOPSFIELD	ACTIVE	BAREHILL RD/WILMOR RD	SLF	1999	59	59	MUNICIPAL	MUNICIPAL	N	ESSEX	YES	NO	NO	NO	NO		5200	5200	5200	5200	5200

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ID#	TOWN	STATUS	ADDRESS	KIND	CLOSE	30H ACRES	DEQE ACRES	OWNER	OPER	RES	COUNTY	REFUSE	DEMO	ASH	SLUDGE	STUMPS	OIL CONT SOIL	LTPY 85	LTPY 86	LTPY 87	LTPY 88	LTPY 90
831	TOWNSEND	ACTIVE	TURNPIKE RD	SLF	1997	22	10	MUNICIPAL	COMMERCIAL	C	MIDDLESEX	YES	NO	NO	NO	NO	YES	4500	4500	4500	4500	4500
833	TRURO	ACTIVE	RTE 6	SLF	1990	16	6	MUNICIPAL	MUNICIPAL	S	BARNSTABLE	YES	NO	NO	NO	NO		2500	2500	2500	2500	2500
834	TYNGSBOROUGH	CLOSED	DUNSTABLE RD (GEORGE RECLAIM)	SLF	1984	70	0	COMMERCIAL	COMMERCIAL	C	MIDDLESEX	NO	NO	NO	NO	NO		0	0	0	0	0
836	TYRINGHAM	ACTIVE	MONTEREY RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	YES	NO	NO	YES		0	0	0	0	0
839	UPTON	INACTIVE	WARREN ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		0	0	0	0	0
840	UXBRIDGE	ACTIVE	HAZEL ST	SLF	1988	13	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		5000	5000	5000	5000	0
842	UXBRIDGE	ACTIVE	RIVER RD	WWTP/DDS	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	MUNICIPAL	NO		200	200	200	200	200
844	WALES	ACTIVE	HOLLOW ROAD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	NO	YES	NO	NO	YES		0	0	0	0	0
845	WALES	INACTIVE	SEIZER DRIVE	SLF	0	0	0	COMMERCIAL	COMMERCIAL	W	HAMPDEN	NO	NO	NO	NO	NO		0	0	0	0	0
846	WALPOLE	INACTIVE	NORFOLK/WEST ST	DLF	0	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	NO	YES	NO	NO	NO		0	0	0	0	0
849	WALPOLE	INACTIVE	LINCOLN RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	NO	NO	NO		0	0	0	0	0
850	WALPOLE	INACTIVE	WASHINGTON ST (BIRD)	SLF	0	0	0	COMMERCIAL	COMMERCIAL	N	NORFOLK	NO	NO	NO	NO	NO		0	0	0	0	0
851	WALTHAM	ACTIVE	COVEST/NORUMBEGA TER	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	NO	NO	YES	NO	NO		0	0	0	0	0
854	WALTHAM	INACTIVE	WOERD AVE	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
855	WARE	ACTIVE	ROBBINS RD	SLF/NWTP	1988	15	15	MUNICIPAL	COMMERCIAL	W	HAMPSHIRE	YES	NO	NO	MUNICIPAL	NO		30500	30500	36500	36500	0
860	WAREHAM	ACTIVE	RTE 6/OFF SANDWICH RD	WWTP/DDS	0	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	NO	NO	NO	MUNICIPAL	NO		313	313	313	313	313
863	WARREN	ACTIVE	BRIMFIELD RD/SOUTH ST	SLF	1993	20	20	MUNICIPAL	COMMERCIAL	C	WORCESTER	YES	NO	NO	NO	NO		2500	2500	2500	2500	2500
864	WARWICK	ACTIVE	GARAGE RD	SLF	1993	20	5	MUNICIPAL	MUNICIPAL	W	FRANKLIN	YES	NO	NO	NO	NO		600	600	520	520	600
865	WARWICK	INACTIVE	SOUTH ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	FRANKLIN	NO	NO	NO	NO	NO		0	0	0	0	0
866	WASHINGTON	INACTIVE	FROST RD/RTE 8	SLF	1977	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	NO	YES	NO	NO		77	0	0	0	0
867	WATERTOWN	INACTIVE	ARLINGTON/COOLIDGE HILL (SCA)	SLF	0	0	0	COMMERCIAL	COMMERCIAL	N	MIDDLESEX	NO	NO	NO	NO	NO		0	0	0	0	0
868	WATERTOWN	INACTIVE	HIGHLAND AVE/ONLEY ST	SLF	1961	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	NO	NO	NO	NO	NO		0	0	0	0	0
869	WATERTOWN	INACTIVE	PLEASANT ST	SLF	1956	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
870	WATERTOWN	INACTIVE	166 GROVE ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
871	WATERTOWN	INACTIVE	BEMIS ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
872	WATERTOWN	INACTIVE	BF GOODRICH	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
876	WAYLAND	ACTIVE	RTE 20	SLF	1990	25	4	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	MUNICIPAL	NO		18000	18000	18000	18000	18000
877	WEBSTER	ACTIVE	CUDWORTH RD	SLF	1988	10	6	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	INDUSTRIAL	NO		25000	25000	25000	25000	0
879	WEBSTER	ACTIVE	HILL ST	WWTP/DDS	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	YES	MUNICIPAL	NO		1400	1400	1400	1400	1400
880	WELLESLEY	INACTIVE	169 GREAT PLAIN ST	SLF	1975	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	NO	NO	NO	NO	NO		0	0	0	0	0
883	WELLFLEET	ACTIVE	COLES NECK RD/BOND BK IS RD	SLF	1988	18	9	MUNICIPAL	MUNICIPAL	S	BARNSTABLE	YES	NO	NO	NO	NO		3000	3000	3000	3000	0
882	WENDELL	ACTIVE	NEW SALEM RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	FRANKLIN	NO	YES	NO	NO	YES		0	0	0	0	0
884	WENHAM	INACTIVE	WOODSIDE LN/PLEASENT	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	ESSEX	NO	NO	NO	NO	NO		0	0	0	0	0
885	WEST BOYLSTON	INACTIVE	RTE 140/35 WORCESTER ST	SLF	1986	11	11	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		4000	4000	0	0	0
886	WEST BRIDGEWATER	INACTIVE	ELM/S ELM ST	SLF	1987	0	0	MUNICIPAL	MUNICIPAL	S	PLYMOUTH	YES	NO	NO	NO	NO		4000	4000	4000	0	0
887	WEST BRIDGEWATER	INACTIVE	ELM/S ELM ST (BOURDINS)	SLF	0	16	0	MUNICIPAL	COMMERCIAL	S	PLYMOUTH	NO	NO	NO	NO	NO		0	0	0	0	0
888	WEST BROOKFIELD	ACTIVE	WIGWAM RD	SLF	1988	33	13	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		2000	2000	2000	2000	0
891	WEST NEWBURY	INACTIVE	MIDDLE ST/GEORGETOWN (STEELE)	SLF	1985	5	5	COMMERCIAL	COMMERCIAL	N	ESSEX	YES	NO	NO	NO	NO		2000	2000	0	0	0
892	WEST STOCKBRIDGE	INACTIVE	MOSCOW ST (LIME QUARRY)	SLF	0	0	0	COMMERCIAL	COMMERCIAL	W	HAMPDEN	NO	NO	NO	NO	NO		0	0	0	0	0
893	WEST TISBURY	ACTIVE	VINEYARD HAVEN RD	SLF	1989	10	0	MUNICIPAL	MUNICIPAL	S	DUKES	YES	NO	NO	NO	NO		800	800	800	800	0
894	WESTBOROUGH	ACTIVE	HOPKINTON RD/RTE 135 (HARVEY)	SLF	1988	0	0	COMMERCIAL	COMMERCIAL	C	WORCESTER	YES	NO	NO	NO	NO		22500	22500	22500	22500	0
896	WESTBOROUGH	ACTIVE	MEADOW RD	WWTP/DDS	0	0	0	MUNICIPAL	MUNICIPAL	C	WORCESTER	NO	NO	NO	MUNICIPAL	NO		42	42	42	42	42
898	WESTFIELD	ACTIVE	TWISS ST	SLF	1988	20	20	MUNICIPAL	MUNICIPAL	W	HAMPDEN	YES	NO	NO	MUNICIPAL	NO		52000	52000	44200	44200	0
899	WESTFIELD	INACTIVE	LOCKHOUSE RD	SLF	1950	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	YES	NO	NO	NO	NO		0	0	0	0	0
901	WESTFORD	INACTIVE	COLD SPRING RD	SLF	1985	17	0	MUNICIPAL	MUNICIPAL	C	MIDDLESEX	YES	NO	NO	NO	NO		8000	0	0	0	0
902	WESTHAMPTON	ACTIVE	HATHAWAY RD	SLF	1998	25	5	MUNICIPAL	COMMERCIAL	W	HAMPSHIRE	YES	NO	NO	NO	NO		1095	1095	800	800	0

REGIONAL LANDFILL INFORMATION- PART ONE
LAST UPDATE - FEBRUARY 1, 1988
DEQE-DIVISION OF SOLID WASTE MANAGEMENT
1 WINTER ST. BOSTON, MA. 02108

ID#	TOWN	STATUS	ADDRESS	KIND	CLOSE	BOH ACRES	DEQE ACRES	OWNER	OPER	REG	COUNTY	REFUSE	DEMO	ASH	SLUDGE	STUMPS	OIL CONT SOIL	LTPY 85	LTPY 86	LTPY 87	LTPY 88	LTPY 89
903	WESTHAMPTON	INACTIVE	SOUTHAMPTON RD	SLF	0	3	0	COMMERCIAL	MUNICIPAL	W	HAMPSHIRE	NO	NO	YES	NO	NO		0	0	0	0	0
904	WESTMINSTER	ACTIVE	RTE 31 (RCI)	SLF	1983	0	0	MUNICIPAL	COMMERCIAL	C	WORCESTER	YES	NO	NO	INDUSTRIAL	NO		40000	52200	52200	52200	52200
907	WESTON	ACTIVE	CHURCH ST	SLF	1988	3	3	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		7300	7300	7300	7300	0
908	WESTON	INACTIVE	*	SLF	0	17	0	COMMERCIAL	MUNICIPAL	N	MIDDLESEX	NO	NO	NO	NO	NO		0	0	0	0	0
910	WESTPORT	ACTIVE	HICKSBRIDGE RD	SLF	1990	20	20	MUNICIPAL	MUNICIPAL	S	BRISTOL	YES	YES	NO	NO	YES		5200	5200	5200	5200	5200
912	WESTWOOD	INACTIVE	RTE 109/ST MARYS	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	YES	NO	NO		0	0	0	0	0
915	WEYMOUTH	INACTIVE	WHARF ST	SLF	1965	0	0	MUNICIPAL	MUNICIPAL	N	NORFOLK	YES	NO	NO	NO	NO		0	0	0	0	0
921	WILBRAHAM	ACTIVE	RAILROAD AVE-CORNER	SLF	1991	15	15	MUNICIPAL	MUNICIPAL	W	HAMPDEN	NO	NO	NO	NO	NO		7500	7500	7500	7500	7500
922	WILBRAHAM	INACTIVE	RAILROAD AVE-EAST	SLF	1971	0	0	MUNICIPAL	MUNICIPAL	W	HAMPDEN	NO	NO	NO	NO	NO		0	0	0	0	0
923	WILBRAHAM	ACTIVE	RTE 20/GRASSEY HOLLOW	SLF	0	16	15	MUNICIPAL	MUNICIPAL	W	HAMPDEN	YES	YES	NO	NO	YES		0	0	0	0	0
925	WILLIAMSTOWN	ACTIVE	SIMONDS RD (HOOSIC WATER QUAL DISTRICT)	SLF/WWTP	1993	60	12	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	YES	YES	NO	MUNICIPAL	YES		7500	9200	9200	9200	9200
930	WILLIAMSTOWN	INACTIVE	WILLIAMS COLLEGE	SLF	1973	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	NO	NO	NO	NO		0	0	0	0	0
931	WILLIAMSTOWN	INACTIVE	STETSON RD	SLF	0	0	0	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	NO	NO	NO	NO	NO		0	0	0	0	0
934	WILMINGTON	INACTIVE	BALLARDVALE RD	SLF	1976	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		0	0	0	0	0
935	WINCHENDON	ACTIVE	RIVER ST	SLF	1990	25	8	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		4000	4000	4000	4000	4000
938	WINCHENDON	INACTIVE	RIVER ST (CJ MABARDY)	DLF	1986	152	6	COMMERCIAL	COMMERCIAL	C	WORCESTER	NO	YES	YES	NO	NO		0	0	0	0	0
939	WINCHESTER	INACTIVE	SWANTON	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	NO	NO	NO	NO	NO		0	0	0	0	0
941	WINDSOR	ACTIVE	RTE 9	SLF	1988	4	4	MUNICIPAL	MUNICIPAL	W	BERKSHIRE	YES	NO	NO	NO	NO		508	508	508	508	0
943	WINTHROP	INACTIVE	ANSYLE ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	N	FRANKLIN	NO	NO	NO	NO	YES		0	0	0	0	0
944	WINTHROP	ACTIVE	DEER ISLAND/P.O. BOX 100	WWTP/DOS	0	0	0	MUNICIPAL	MUNICIPAL	N	FRANKLIN	NO	NO	NO	MUNICIPAL	NO		69825	69825	69825	69825	69825
945	WOBURN	ACTIVE	MERRIMAC ST	SLF	1988	54	0	MUNICIPAL	MUNICIPAL	N	MIDDLESEX	YES	NO	NO	NO	NO		26500	26500	0	0	0
948	WORCESTER	CLOSED	GREENWOOD ST	SLF	1985	92	85	MUNICIPAL	MUNICIPAL	C	WORCESTER	YES	NO	NO	NO	NO		148000	0	0	0	0
950	WORTHINGTON	ACTIVE	DINGLE RD (EMERSON DAVIS)	SLF	0	0	0	COMMERCIAL	COMMERCIAL	W	HAMPSHIRE	NO	YES	NO	NO	YES		0	0	0	0	0
954	YARMOUTH	ACTIVE	UNION ST	SLF	1989	105	105	MUNICIPAL	MUNICIPAL	S	BARNSTABLE	YES	YES	NO	NO	YES		24500	24500	24500	24500	0
958	YARMOUTH	ACTIVE	UNION ST	SLF	0	0	0	MUNICIPAL	MUNICIPAL	S	BARNSTABLE	*	*	NO	NO	NO		0	0	0	0	0
*** Total ***																						
****																		4739726	4887762	5954987	5612447	4585299

LD 4825

ACME
BOOKBINDING CO., INC.

MAY 5 1990

AMBRIDGE STREET
HARLESTOWN, MASS.